

FAA Pavement Design

Flexible Pavement FAARFIELD Design Example

Presented to: FAA Southwest Region
2008 Partnership Conference

By: Rodney N. Joel, P.E.
Civil Engineer / Airfield Pavement
Airport Engineering Division

Date: March 11, 2008



**Federal Aviation
Administration**



FAARFIELD Flexible Pavement Design

The image displays three overlapping windows from the FAARFIELD software, used for airport pavement design.

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Job Files: 6Example, ACPA-Workshop, bob, checkminbase, DENPCN, designexamplein6E, fulldepthACC, joplin, lightdutydesign, myrtlebeach, rigid, Samples, schuler, SegPistaAepToCanc, TestASCEexample

Organization: New Job, Delete Job, Dup. Section, Copy Section, Delete Section, Options, Exit

Data Input: Structure, Notes

Section Name: NewFlex, NewRigid

Pavement Type: New Flexible, New Rigid

Accompanies Draft AC 150/5320-6E

FAARFIELD - Modify and Design Section NewFlex in Job 6Example

Section Names: NewFlex, NewRigid

6Example NewFlex Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 11.06 | |
| P-209 Cr Aq | 18.79 | |
| Subgrade | CBR = 8.0 | |

Total thickness to the top of the subgrade

FAARFIELD - Create or Modify Aircraft for Section NewFlex in Job 6Example

Aircraft Group: Generic, Airbus, Boeing, Other Commercial, General Aviation, Military, External Library

Library Aircraft: SWL-50, Singl Whl-3, Singl Whl-5, Singl Whl-10, Singl Whl-12.5, Singl Whl-15, Singl Whl-20, Singl Whl-30, Singl Whl-45, Singl Whl-60, Singl Whl-75, Dual Whl-10, Dual Whl-20, Dual Whl-30, Dual Whl-45, Dual Whl-50, Dual Whl-60, Dual Whl-75, Dual Whl-100

| Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth | 1 st Dep |
|--------------------|-------------------------|-------------------|-----------------|---------------------|
| A340-600 std ... | 805,128 | 1,000 | 0.00 | 2 |
| A380-800 | 1,239,000 | 300 | 0.00 | 4 |
| B737-800 | 174,700 | 2,000 | 0.00 | 4 |
| B747-400 | 877,000 | 400 | 0.00 | 4 |
| B747-400ER | 913,000 | 300 | 0.00 | 4 |
| B757-300 | 271,000 | 1,200 | 0.00 | 2 |
| B767-400 ER | 451,000 | 800 | 0.00 | 1 |
| B777-300 ER | 777,000 | 1,000 | 0.00 | 2 |
| B787-8 | 478,000 | 600 | 0.00 | 1 |

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

FAARFIELD Flexible Pavement Design

Starting Screen – No Job Files Created

Click on “New Job”

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

| Job Files | Organization | Section Name | Pavement Type |
|-----------|----------------|--------------|-------------------|
| Samples | New Job | ACAggregate | New Flexible |
| | Delete Job | AConFlex | AC on Flexible |
| | Dup. Section | AConRigid | AC on Rigid |
| | Copy Section | NewFlexible | New Flexible |
| | Delete Section | NewRigid | New Rigid |
| | | PCConFlex | PCC on Flexible |
| | | PCConRigid | Unbonded on Rigid |

Data Input

Structure

Notes

Options

Exit

Working Directory

C:\Program Files\FAA\FAARFIELD\

Accompanies Draft AC 150/5320-6E

Help Demonstration About

FAARFIELD Flexible Pavement Design

Creating / Naming a Job File

Enter Job Title

Click OK

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Job File

Samples

Organization

New Job

Delete Job

Section Name **Pavement Type**

| | |
|-------------|-------------------|
| ACAggregate | New Flexible |
| AConFlex | AC on Flexible |
| AConRigid | AC on Rigid |
| NewFlexible | New Flexible |
| NewRigid | New Rigid |
| PCConFlex | PCC on Flexible |
| PCConRigid | Unbonded on Rigid |

Creating a New Job

A new job will be created with no section data. Use "Copy Section" and "Dup. Section" to transfer aircraft and section data to the new job.

Enter the name of the new job and click OK or press Enter. Up to 15 characters can be entered (all the alphanumeric plus "-" and "_").

PROJECT

OK Cancel

Data Input

Structure

Notes

Working Directory

es\FAA\FAARFIELD\

Accompanies Draft AC 150/5320-6E

Help Demonstration About

FAARFIELD Flexible Pavement Design

Copy Basic Section/Pavement Type from Samples

Click on "samples" →

The screenshot shows the FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07) software interface. The interface is divided into several sections:

- Job Files:** A list containing "PROJECT" and "Samples". A red arrow points to the "Samples" entry.
- Organization:** A vertical stack of buttons: "New Job", "Delete Job", "Dup. Section", "Copy Section", and "Delete Section".
- Data Input:** A vertical stack of buttons: "Structure" and "Notes".
- Section Name / Pavement Type:** A large empty table area for data entry.
- Working Directory:** A text field showing "C:\Program Files\FAA\FAARFIELD\".
- Bottom Bar:** Contains the text "Accompanies Draft AC 150/5320-6E" and three buttons: "Help", "Demonstration", and "About".

FAARFIELD Flexible Pavement Design

Copy Basic Section/Pavement Type from Samples

Default Basic
Pavement
Sections

Click on
“Copy Section”

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

| Job Files | Organization | Section Name | Pavement Type |
|-----------|----------------|--------------|-------------------|
| PROJECT | New Job | ACAggregate | New Flexible |
| Samples | Delete Job | AConFlex | AC on Flexible |
| | Dup. Section | AConRigid | AC on Rigid |
| | Copy Section | NewFlexible | New Flexible |
| | Delete Section | NewRigid | New Rigid |
| | | PCConFlex | PCC on Flexible |
| | | PCConRigid | Unbonded on Rigid |

Data Input

Structure

Notes

Options

Exit

Working Directory

C:\Program Files\FAA\FAARFIELD\

Help Demonstration About

Accompanies Draft AC 150/5320-6E

FAARFIELD Flexible Pavement Design

7 Basic Starting Structures in LEDFAA

| Section Name | Pavement Type |
|--------------|--------------------------------------|
| ACAggregate | New flexible on Aggregate base |
| AConFlex | Asphalt overlay on Flexible pavement |
| AConRigid | Asphalt overlay on Rigid pavement |
| NewFlexible | New Flexible on stabilized base |
| NewRigid | New Rigid on stabilized base |
| PCConFlex | PCC overlay on flexible |
| PCConRigid | Unbonded PCC on rigid |

Be sure to select the pavement type that most correctly represents your pavement needs

FAARFIELD Flexible Pavement Design

Copy a Typical Pavement Section

Click on desired pavement section

Job Files

PROJECT
Samples

Select a section to be copied from the right hand list box.

Then select the job to copy it to from the left hand list box.

Click End Copy when done or if you make a mistake selecting the section.

Section Name **Pavement Type**

| | |
|--------------------|---------------------|
| ACAggregate | New Flexible |
| AConFlex | AC on Flexible |
| AConRigid | AC on Rigid |
| NewFlexible | New Flexible |
| NewRigid | New Rigid |
| PCConFlex | PCC on Flexible |
| PCConRigid | Unbonded on Rigid |

Data Input

Structure
Notes

End Copy
Delete Section
Options
Exit

Working Directory
C:\Program Files\FAA\FAARFIELD\

Help Demonstration About

Accompanies Draft AC 150/5320-6E

Then click on the project where the section will be saved

FAARFIELD Flexible Pavement Design

Create a New Job Title

Enter Job Title

Click OK

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Job Files

PROJECT
Samples

Select a section to be copied from the right hand list box.

Section Name **Pavement Type**

| | |
|--------------------|---------------------|
| ACAggregate | New Flexible |
| AConFlex | AC on Flexible |
| AConRigid | AC on Rigid |
| NewFlexible | New Flexible |
| | New Rigid |
| | PCC on Flexible |
| | Unbonded on Rigid |

Copying a Section

To copy the section with the name unchanged, click OK or press Enter. Otherwise, enter a new name and click OK or press Enter.

Up to twelve alphanumeric characters can be entered.

NewFlexible

OK Cancel

Data Input

Structure

Notes

Options

Exit

Working Directory

C:\Program Files\FAA\FAARFIELD\

Help Demonstration About

Accompanies Draft AC 150/5320-6E

FAARFIELD Flexible Pavement Design

Create a New Job Title

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Job Files

PROJECT
Samples

Select a section to be copied from the right hand list box.

Then select the job to copy it to from the left hand list box.

Click End Copy when done or if you make a mistake selecting the section.

Section Name

Pavement Type

| | |
|--------------------|---------------------|
| ACAggregate | New Flexible |
| AConFlex | AC on Flexible |
| AConRigid | AC on Rigid |
| NewFlexible | New Flexible |
| NewRigid | New Rigid |
| PCConFlex | PCC on Flexible |
| PCConRigid | Unbonded on Rigid |

Data Input

Structure

Notes

End Copy

Delete Section

Options

Exit

Working Directory

C:\Program Files\FAA\FAARFIELD\

Help

Demonstration

About

Accompanies Draft AC 150/5320-6E

Click "End Copy"



FAARFIELD Flexible Pavement Design

Working With a Design Structure

Select the job and then select the section you want to analyze

Click on "Structure"
To open the file

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

| Job Files | Organization | Section Name | Pavement Type |
|--------------------|--|--------------|---------------|
| PROJECT Samples | New Job Delete Job Dup. Section Copy Sections Delete Section | NewFlexible | New Flexible |

Data Input

Structure
Notes

Options
Exit

Working Directory
C:\Program Files\FAA\FAARFIELD\

Help
Demonstration
About

Accompanies Draft AC 150/5320-6E

FAARFIELD Flexible Pavement Design

Working With a Pavement Section

The selected sample pavement will appear

The structure may be modified if desired

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 8.00 | 400,000 |
| P-209 CrAg | 10.00 | 75,000 |
| Subgrade | CBR = 10.0 | 15,000 |

→

Total thickness to the top of the subgrade, $t = 23.00$ in

Status

Aircraft

Back Help Life **Modify Structure** Design Structure Save Structure

FAARFIELD Flexible Pavement Design

Modifying a Pavement Section

Click on the box around the layer material you want to modify

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 8.00 | 400,000 |
| → P-209 CrAg | 10.00 | 75,000 |
| Subgrade | CBR = 10.0 | 15,000 |

Total thickness to the top of the subgrade, t = 23.00 in

Status

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD Flexible Pavement Design

Modifying a Pavement Section

Select the layer type you want to include in your pavement section

No modification for this example

Click OK

Cancel for this example

FAARFIELD - Modifying Section NewFlexible in Job PROJECT

Section Names: PROJECT, NewFlexible, Des. Life = 20

Modulus or R (psi)

| Layer Type | Modulus or R (psi) |
|------------|--------------------|
| Surface | 200,000 |
| Base | 400,000 |
| Subbase | 75,000 |
| Subgrade | CBR = 10.0, 15,000 |

Total thickness to the top of the subgrade, $t = 23.00$ in

Layer Type Selection

- ☐ Undefined
- ☐ Subgrade
- Aggregate**
 - ☐ P-208 (see Note)
 - ☒ P-209 Crushed
 - ☐ P-154 Uncrushed
- HMA: All P-401 / P-403**
 - ☐ Surface
 - ☐ Overlay
- Stabilized (flexible)**
 - ☐ Variable
 - ☐ P-401 / P-403 HMA
- PCC: All P-501**
 - ☐ Surface
 - ☐ Overlay fully unbonded
 - ☐ Overlay partially bonded
 - ☐ Overlay on flexible
- Stabilized (rigid)**
 - ☐ Variable
 - ☐ P-301 Soil Cement Base
 - ☐ P-304 Cement Treated Base
 - ☐ P-306 Econocrete Subbase
 - ☐ Rubblized PCC Base

OK Cancel

Modifying Structure

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

FAARFIELD Flexible Pavement Design

Layer Placement Restrictions

There are restriction on placement of certain pavement layers.

e.g. You can not place an “overlay” below a “surface” course.

Other restrictions prevent or cause changes in the pavement type (flexible or rigid)

e.g. Changing a surface asphalt layer to a rigid layer will change the pavement type.

FAARFIELD Flexible Pavement Design

Modifying a Pavement Section

FAARFIELD - Modifying Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 8.00 | 400,000 |
| P-209 Cr Ag | 10.00 | 75,000 |
| Subgrade | CBR = 10.0 | 15,000 |

Total thickness to the top of the subgrade, $t = 23.00$ in

Status

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

Click on a property to modify any of the layer properties

Modify the subgrade CBR for this example

FAARFIELD Flexible Pavement Design

Modifying a Pavement Section

Enter the new value
for the material
property

**** some materials
will have limits on
property values**

use 8 for this example

Click OK

FAARFIELD - Modifying Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| | | 10,000 |
| | | 5,000 |
| Subgrade | CBR = 10.0 | 15,000 |

Total thickness to the top of the subgrade, t = 23.00 in

Status

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

St (Flexible)

Subgrade CBR can be set in the range 0.7 to 33.3 percent.

Enter the new value in percent and click OK or press Enter.

Click Cancel at any time to retain the old value.

8

OK Cancel

FAARFIELD Flexible Pavement Design

Modifying a Pavement Section

New values appear
in the structure
window

Click End Modify

FAARFIELD - Modifying Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| P-401 / P-403 HMA Surface | 5.00 | 200,000 |
| P-401 / P-403 St (flex) | 8.00 | 400,000 |
| → P-209 Cr Ag | 10.00 | 75,000 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, $t = 23.00$ in

Status

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

FAARFIELD Flexible Pavement Design

Enter Traffic Mixture

Click on "Aircraft"
To enter traffic mix

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 8.00 | 400,000 |
| → P-209 CrAg | 10.00 | 75,000 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, $t = 23.00$ in

Status

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD Flexible Pavement Design

Enter Traffic Mixture

You may want to
clear any existing
airplanes

FAARFIELD - Create or Modify Aircraft for Section NewFlexible in Job PROJECT

| Aircraft Name (3) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth | Total Departures |
|-------------------|-------------------------|-------------------|-----------------|------------------|
| DC10-10 | 458,000 | 2,263 | 0.00 | 45,2 |
| B747-200B C... | 873,000 | 832 | 0.00 | 16,6 |
| B777-200 ER | 634,500 | 425 | 0.00 | 8,5 |

Aircraft Group

- Generic
- Airbus
- Boeing
- Other Commercial
- General Aviation
- Military
- External Library

Library Aircraft

- S'WL-50
- Sngl Whl-3
- Sngl Whl-5
- Sngl Whl-10
- Sngl Whl-12.5
- Sngl Whl-15
- Sngl Whl-20
- Sngl Whl-30
- Sngl Whl-45
- Sngl Whl-60
- Sngl Whl-75
- Dual Whl-10
- Dual Whl-20
- Dual Whl-30
- Dual Whl-45
- Dual Whl-50
- Dual Whl-60
- Dual Whl-75
- Dual Whl-100

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Float Aircraft

Click on the airplane
group desired.

Then select the
desired airplane
and click "Add"

Repeat for complete
traffic mixture

FAARFIELD Flexible Pavement Design

Traffic Mix for this example

| No. | Name | Gross Weight, lb | Annual Departures | Annual Growth, % |
|-----|--------------------|------------------|-------------------|------------------|
| 1 | A320-100 | 150,796 | 600 | 0.00 |
| 2 | A340-600 std | 805,128 | 1,000 | 0.00 |
| 3 | A340-600 std Belly | 805,128 | 1,000 | 0.00 |
| 4 | A380-800 | 1,239,000 | 300 | 0.00 |
| 5 | B737-800 | 174,700 | 2,000 | 0.00 |
| 6 | B747-400 | 877,000 | 400 | 0.00 |
| 7 | B747-400ER | 913,000 | 300 | 0.00 |
| 8 | B757-300 | 271,000 | 1,200 | 0.00 |
| 9 | B767-400 ER | 451,000 | 800 | 0.00 |
| 10 | B777-300 ER | 777,000 | 1,000 | 0.00 |
| 11 | B787-8 | 478,000 | 600 | 0.00 |

FAARFIELD Flexible Pavement Design

Enter Traffic Mixture

Certain airplanes may appear in the list twice. This is to address the presence of wing gears and belly gears

FAARFIELD treats these as two airplanes however the weight and departures are interlocked

FAARFIELD - Create or Modify Aircraft for Section NewFlexible in Job PROJECT

| Aircraft Group | Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth |
|------------------|--------------------|-------------------------|-------------------|-----------------|
| Generic | A320-100 | 150,796 | 600 | 0.00 |
| Airbus | A340-600 std | 805,128 | 1,000 | 0.00 |
| Boeing | A340-600 std Belly | 805,128 | 1,000 | 0.00 |
| Other Commercial | A380-800 | 1,239,000 | 300 | 0.00 |
| General Aviation | B737-800 | 174,700 | 2,000 | 0.00 |
| Military | B747-400 | 877,000 | 400 | 0.00 |
| External Library | B747-400ER | 913,000 | 300 | 0.00 |
| | B757-300 | 271,000 | 1,200 | 0.00 |
| | B767-400 ER | 451,000 | 800 | 0.00 |
| | B777-300 ER | 777,000 | 1,000 | 0.00 |

Library Aircraft

SWL-50

Sngl Whl-3

Sngl Whl-5

Sngl Whl-10

Sngl Whl-12.5

Sngl Whl-15

Sngl Whl-20

Sngl Whl-30

Sngl Whl-45

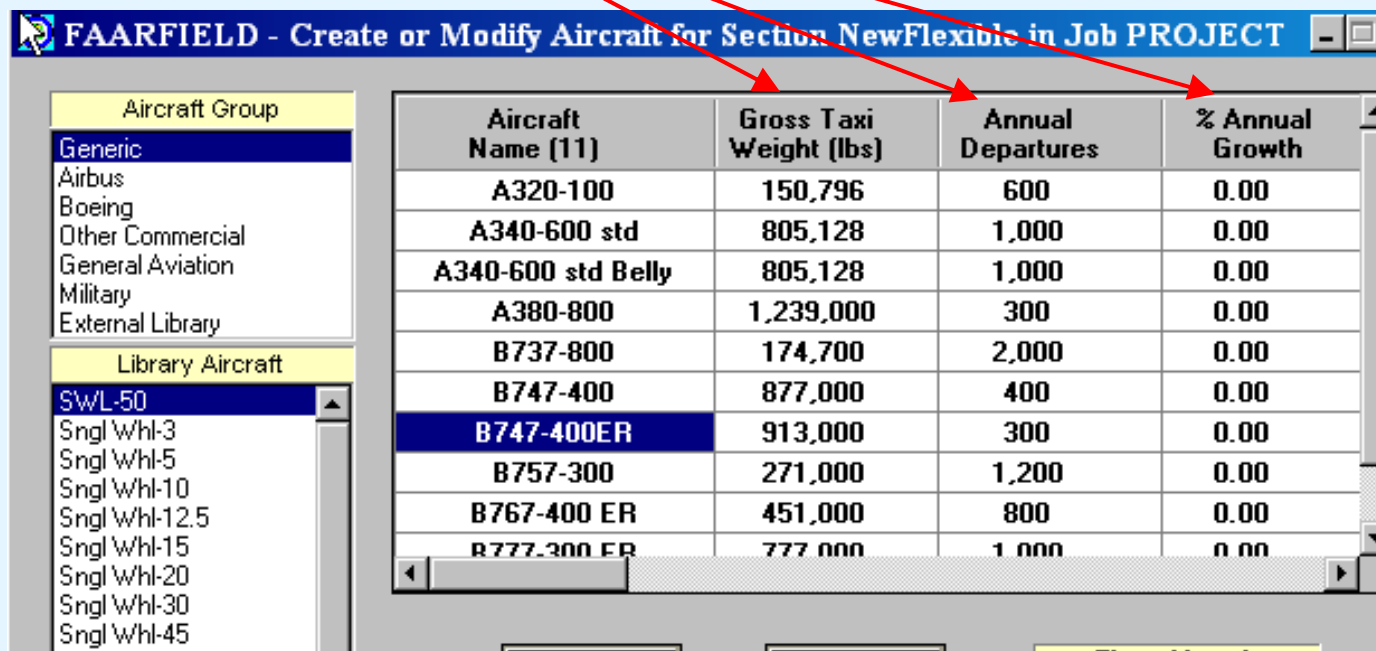
Sngl Whl-60

Elect Aircraft

FAARFIELD Flexible Pavement Design

Adjusting Airplane Information

Gross Taxi Weight, Annual Departures and % Annual Growth may be modified



FAARFIELD - Create or Modify Aircraft for Section NewFlexible in Job PROJECT

| Aircraft Group | Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth |
|------------------|--------------------|-------------------------|-------------------|-----------------|
| Generic | A320-100 | 150,796 | 600 | 0.00 |
| Airbus | A340-600 std | 805,128 | 1,000 | 0.00 |
| Boeing | A340-600 std Belly | 805,128 | 1,000 | 0.00 |
| Other Commercial | A380-800 | 1,239,000 | 300 | 0.00 |
| General Aviation | B737-800 | 174,700 | 2,000 | 0.00 |
| Military | B747-400 | 877,000 | 400 | 0.00 |
| External Library | B747-400ER | 913,000 | 300 | 0.00 |
| Library Aircraft | B757-300 | 271,000 | 1,200 | 0.00 |
| SWL-50 | B767-400 ER | 451,000 | 800 | 0.00 |
| Sngl Whl-3 | B777-300 ER | 777,000 | 1,000 | 0.00 |
| Sngl Whl-5 | | | | |
| Sngl Whl-10 | | | | |
| Sngl Whl-12.5 | | | | |
| Sngl Whl-15 | | | | |
| Sngl Whl-20 | | | | |
| Sngl Whl-30 | | | | |
| Sngl Whl-45 | | | | |

FAARFIELD Flexible Pavement Design

Adjusting Airplane Information – Gross Weight

Click on the airplane gross weight to change the weight

FAARFIELD - Create or Modify Aircraft for Section NewFlexible in Job PROJECT

| Aircraft Group | Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth |
|------------------|--------------------|-------------------------|-------------------|-----------------|
| Generic | A320-100 | 150,796 | 600 | 0.00 |
| Airbus | A340-600 std | 805,128 | 1,000 | 0.00 |
| Boeing | A340-600 std Belly | 805,128 | 1,000 | 0.00 |
| Other Commercial | A380-800 | 1,239,000 | 300 | 0.00 |
| General Aviation | B737-800 | 174,700 | 2,000 | 0.00 |
| Military | B747-400 | 877,000 | 400 | 0.00 |
| External Library | B747-400ER | 913,000 | 300 | 0.00 |
| | B757-300 | 271,000 | 1,200 | 0.00 |
| | B767-400 ER | 451,000 | 800 | 0.00 |
| | B777-300 ER | 777,000 | 1,000 | 0.00 |

Library Aircraft

- SWL-50
- Sngl Whl-3
- Sngl Whl-5
- Sngl Whl-10
- Sngl Whl-12.5
- Sngl Whl-15
- Sngl Whl-20
- Sngl Whl-30
- Sngl Whl-45
- Sngl Whl-60
- Sngl Whl-75
- Dual Whl-10
- Dual Whl-20
- Dual Whl-30
- Dual Whl-45
- Dual Whl-50
- Dual Whl-60
- Dual Whl-75
- Dual Whl-100

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Float Aircraft

- A320-100
- A340-600 std
- A340-600 std Belly
- A380-800
- B737-800
- B747-400
- B747-400ER
- B757-300

Adjusting Airplane Information – Gross Weight

Aircraft Group

Generic

Airbus

Boeing

Other Commercial

General Aviation

Military

External Library

| Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth |
|--------------------|-------------------------|-------------------|-----------------|
| A320-100 | 150,796 | 600 | 0.00 |
| A340-600 std | 805,128 | 1,000 | 0.00 |
| A340-600 std Belly | 805,128 | 1,000 | 0.00 |
| A380-800 | 1,239,000 | 300 | 0.00 |

Library Aircraft

S'WL-50

Sngl W/ht-3

Sngl W/ht-5

Sngl W/ht-10

Sngl W/ht-12.5

Sngl W/ht-15

Sngl W/ht-20

Sngl W/ht-30

Sngl W/ht-45

Sngl W/ht-60

Sngl W/ht-75

Dual W/ht-10

Dual W/ht-20

Dual W/ht-30

Dual W/ht-45

Dual W/ht-50

Dual W/ht-60

Dual W/ht-75

Dual W/ht-100

Changing Aircraft Gross Load

The default value of gross load for this aircraft is 913,000 lbs.

Enter a new value in the range:

547,800 to 1,141,250 lbs.

OK Cancel

Save List

Clear List

Save to Float

Add Float

Aircraft

A320-100

A340-600 std

A340-600 std Belly

A380-800

B737-800

B747-400

B747-400ER

B757-300

Back

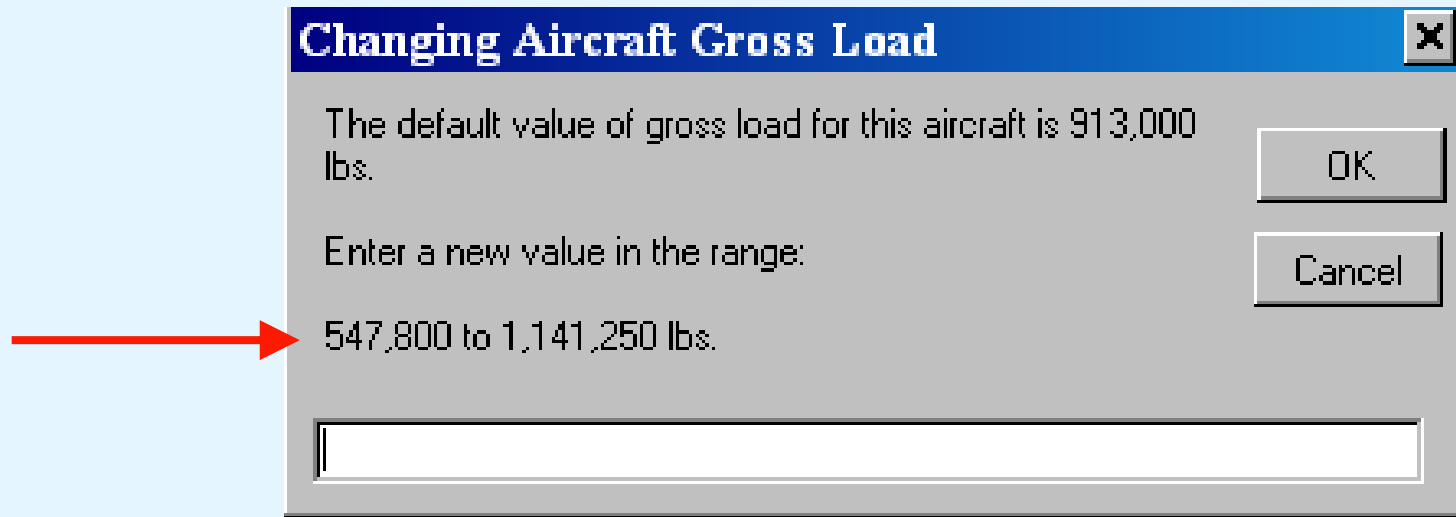
Help

View Gear

FAARFIELD Flexible Pavement Design

Airplane Information – Gross Weight Limitations

There are limitations on changes to airplane gross weights. A range is provided for each airplane which represents reasonable weights for the airplane



FAARFIELD Flexible Pavement Design

Adjusting Airplane Information – Annual Departures

Click on “Annual Departures” to change departures for an airplane

FAARFIELD - Create or Modify Aircraft for Section NewFlexible in Job PROJECT

| Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth |
|--------------------|-------------------------|-------------------|-----------------|
| A320-100 | 150,796 | 600 | 0.00 |
| A340-600 std | 805,128 | 1,000 | 0.00 |
| A340-600 std Belly | 805,128 | 1,000 | 0.00 |
| A380-800 | 1,239,000 | 300 | 0.00 |
| B737-800 | 174,700 | 2,000 | 0.00 |
| B747-400 | 877,000 | 400 | 0.00 |
| B747-400ER | 913,000 | 300 | 0.00 |
| B757-300 | 271,000 | 1,200 | 0.00 |
| B767-400 ER | 451,000 | 800 | 0.00 |
| B777-300 ER | 777,000 | 1,000 | 0.00 |

Aircraft Group

- Generic
- Airbus
- Boeing
- Other Commercial
- General Aviation
- Military
- External Library

Library Aircraft

- SWL-50
- Sngl Whl-3
- Sngl Whl-5
- Sngl Whl-10
- Sngl Whl-12.5
- Sngl Whl-15
- Sngl Whl-20
- Sngl Whl-30
- Sngl Whl-45
- Sngl Whl-60
- Sngl Whl-75
- Dual Whl-10
- Dual Whl-20
- Dual Whl-30
- Dual Whl-45
- Dual Whl-50
- Dual Whl-60
- Dual Whl-75
- Dual Whl-100


Float Aircraft

- A320-100
- A340-600 std
- A340-600 std Belly
- A380-800
- B737-800
- B747-400
- B747-400ER
- B757-300

Buttons:

- Add
- Remove
- Save List
- Clear List
- Save to Float
- Add Float
- Back
- Help
- View Gear

Adjusting Airplane Information – Annual Departures



Generic
Airbus
Boeing
Other Commercial
General Aviation
Military
External Library
Library Aircraft
S/WL-50
Sngl\Whl-3
Sngl\Whl-5
Sngl\Whl-10
Sngl\Whl-12.5
Sngl\Whl-15

The screenshot displays the FAARFIELD software interface. At the top, a title bar reads "FAARFIELD - Create or Modify Aircraft for Section NewFlexible in Job PROJECT". Below this, there are two main panels. The left panel has a yellow header "Aircraft Group" and a blue header "Generic". It contains a scrollable list of aircraft types: Airbus, Boeing, Other Commercial, General Aviation, Military, External Library, Library Aircraft, SWL-50, Sngl Whl-3, Sngl Whl-5, Sngl Whl-10, Sngl Whl-12.5, Sngl Whl-15, Sngl Whl-20, Sngl Whl-30, Sngl Whl-45, Sngl Whl-60, Sngl Whl-75, Dual Whl-10, Dual Whl-20, Dual Whl-30, Dual Whl-45, Dual Whl-50, Dual Whl-60, Dual Whl-75, and Dual Whl-100. A red arrow points from the "Sngl Whl-12.5" entry to the "Changing Annual Departures" dialog box.

The right panel features a table with four columns: "Aircraft Name (11)", "Gross Taxi Weight (lbs)", "Annual Departures", and "% Annual Growth". The table lists several aircraft models with their respective weights and departure counts. A modal dialog box titled "Changing Annual Departures" is overlaid on the table. It prompts the user to "Enter a new value for annual departures in the range: 0 to 100,000" and includes "OK" and "Cancel" buttons. Below the dialog box, there are four buttons: "Add", "Remove", "Save List", and "Clear List". At the bottom of the screen, there are three buttons: "Back", "Help", and "View Gear".

| Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth |
|--------------------|-------------------------|-------------------|-----------------|
| A320-100 | 150,796 | 600 | 0.00 |
| A340-600 std | 805,128 | 1,000 | 0.00 |
| A340-600 std Belly | 805,128 | 1,000 | 0.00 |
| | | | 0.00 |
| | | | 0.00 |
| | | | 0.00 |
| | | | 0.00 |
| | | | 0.00 |
| | | | 0.00 |
| | | | 0.00 |
| | | | 0.00 |

Changing Annual Departures

Enter a new value for annual departures in the range:
0 to 100,000

Click Cancel at any time to retain the old value.

Add
Remove

Save List
Clear List

Save to Float
Add Float

Float Aircraft

- A320-100
- A340-600 std
- A340-600 std Belly
- A380-800
- B737-800
- B747-400
- B747-400ER
- B757-300

Back
Help
View Gear

FAARFIELD Flexible Pavement Design

Annual Departures in FAARFIELD

- Annual departures has the same meaning as the previous design procedure.
- Arrivals are ignored.
- For design purposes FAARFIELD uses the total annual departures, adjusted for growth, multiplied by the total design period in years

e.g. 1200 annual departures X 20 years = 24,000 departures

% Annual Growth of Annual Departures

Enter the percent annual growth and click OK

FAARFIELD - Create or Modify Aircraft for Section NewFlexible in Job PROJECT

Aircraft Group

- Generic
- Airbus
- Boeing
- Other Commercial
- General Aviation
- Military
- External Library

Library Aircraft

- S/WL-50
- Sngl Whl-3
- Sngl Whl-5
- Sngl Whl-10
- Sngl Whl-12.5
- Sngl Whl-15
- Sngl Whl-20
- Sngl Whl-30
- Sngl Whl-45
- Sngl Whl-60
- Sngl Whl-75
- Dual Whl-10
- Dual Whl-20
- Dual Whl-30
- Dual Whl-45
- Dual Whl-50
- Dual Whl-60
- Dual Whl-75
- Dual Whl-100

| Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth |
|--------------------|-------------------------|-------------------|-----------------|
| A320-100 | 150,796 | 600 | 0.00 |
| A340-600 std | 805,128 | 1,000 | 0.00 |
| A340-600 std Belly | 805,128 | 1,000 | 0.00 |
| A380-800 | 1,239,000 | 300 | 0.00 |
| B737-800 | 174,700 | 2,000 | 0.00 |

Changing Incremental Departures

Enter a new value for percent incremental annual departures in the range:

-10.00 to 10.00

Click Cancel at any time to retain the old value.

OK **Cancel**

Save List **Clear List**

Save to Float **Add Float**

Back **Help** **View Gear**

at Aircraft

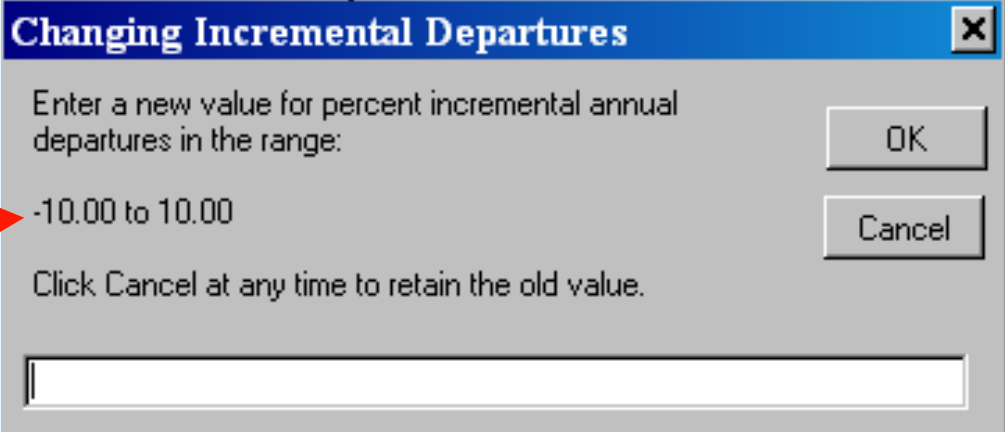
- A340-600 std
- A340-600 std Belly
- A380-800
- B737-800
- B747-400
- B747-400ER
- B757-300

FAARFIELD Flexible Pavement Design

Adjusting Airplane Information –

% Annual Growth of Annual Departures

Allowable range of
percent annual growth is
+/- 10%



Changing Incremental Departures [X]

Enter a new value for percent incremental annual departures in the range:

-10.00 to 10.00

Click Cancel at any time to retain the old value.

OK Cancel

[Input field]

You can create the same effect by modifying the annual departures such that the total annual departures results in the desired total.

FAARFIELD Flexible Pavement Design

Viewing Airplane Information

FAARFIELD - Create or Modify Aircraft for Section NewFlexible in Job PROJECT

| Aircraft Group | Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth |
|------------------|--------------------|-------------------------|-------------------|-----------------|
| Generic | A320-100 | 150,796 | 600 | 0.00 |
| Airbus | A340-600 std | 805,128 | 1,000 | 0.00 |
| Boeing | A340-600 std Belly | 805,128 | 1,000 | 0.00 |
| Other Commercial | A380-800 | 1,239,000 | 300 | 0.00 |
| General Aviation | B737-800 | 174,700 | 2,000 | 0.00 |
| Military | B747-400 | 877,000 | 400 | 0.00 |
| External Library | B747-400ER | 913,000 | 300 | 0.00 |
| | B757-300 | 271,000 | 1,200 | 0.00 |
| | B767-400 ER | 451,000 | 800 | 0.00 |
| | B777-300 ER | 777,000 | 1,000 | 0.00 |

Library Aircraft

- SWL-50
- Sngl Whl-3
- Sngl Whl-5
- Sngl Whl-10
- Sngl Whl-12.5
- Sngl Whl-15
- Sngl Whl-20
- Sngl Whl-30
- Sngl Whl-45
- Sngl Whl-60
- Sngl Whl-75
- Dual Whl-10
- Dual Whl-20
- Dual Whl-30
- Dual Whl-45
- Dual Whl-50
- Dual Whl-60
- Dual Whl-75
- Dual Whl-100

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float

Float Aircraft

- A320-100
- A340-600 std
- A340-600 std Belly
- A380-800
- B737-800
- B747-400
- B747-400ER
- B757-300

Buttons: Back, Help, View Gear

Scroll over to reveal additional columns of information

FAARFIELD Flexible Pavement Design

Airplane Information

Available in FAARFIELD Aircraft Screen

| Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth | Total Departures | CDF Contribution | CDF Max for Aircraft |
|--------------------|-------------------------|-------------------|-----------------|------------------|------------------|----------------------|
| A320-100 | 150,796 | 600 | 0.00 | 12,000 | 0.00 | 0.00 |
| A340-600 std | 805,128 | 1,000 | 0.00 | 20,000 | 0.00 | 0.00 |
| A340-600 std Belly | 805,128 | 1,000 | 0.00 | 20,000 | 0.00 | 0.00 |
| A380-800 | 1,239,000 | 300 | 0.00 | 6,000 | 0.00 | 0.00 |
| B737-800 | 174,700 | 2,000 | 0.00 | 40,000 | 0.00 | 0.00 |
| B747-400 | 877,000 | 400 | 0.00 | 8,000 | 0.00 | 0.00 |
| B747-400ER | 913,000 | 300 | 0.00 | 6,000 | 0.00 | 0.00 |
| B757-300 | 271,000 | 1,200 | 0.00 | 24,000 | 0.00 | 0.00 |
| B767-400 ER | 451,000 | 800 | 0.00 | 16,000 | 0.00 | 0.00 |

| P/C Ratio | Tire Press. (psi) | Percent GW on Gear | Dual Spacing (in) | Tandem Spacing (in) | Tire Contact Width (in) | Tire Contact Length (in) |
|-----------|-------------------|--------------------|-------------------|---------------------|-------------------------|--------------------------|
| 0.00 | 200 | 47.5 | 36.50 | 0.00 | 11.93 | 19.09 |
| 0.00 | 233 | 32.8 | 55.00 | 78.00 | 15.02 | 24.04 |
| 0.00 | 222 | 29.3 | 46.00 | 78.00 | 14.55 | 23.28 |
| 0.00 | 194 | 95.0 | 53.10 | 66.90 | 15.54 | 24.86 |
| 0.00 | 205 | 47.5 | 34.00 | 0.00 | 12.69 | 20.31 |
| 0.00 | 200 | 95.0 | 44.00 | 58.00 | 14.39 | 23.03 |
| 0.00 | 230 | 95.0 | 44.00 | 58.00 | 13.70 | 21.91 |
| 0.00 | 195 | 47.5 | 34.00 | 45.00 | 11.46 | 18.34 |
| 0.00 | 215 | 47.5 | 45.80 | 54.00 | 14.08 | 22.53 |

FAARFIELD Flexible Pavement Design

Viewing Airplane Information

FAARFIELD - Create or Modify Aircraft for Section NewFlexible in Job PROJECT

| Aircraft Group | Aircraft Name (11) | Total Departures | CDF Contribution | CDF Max for Aircraft |
|------------------|--------------------|------------------|------------------|----------------------|
| Generic | A320-100 | 12,000 | 0.00 | 0.00 |
| Airbus | A340-600 std | 20,000 | 0.00 | 0.00 |
| Boeing | A340-600 std Belly | 20,000 | 0.00 | 0.00 |
| Other Commercial | A380-800 | 6,000 | 0.00 | 0.00 |
| General Aviation | B737-800 | 40,000 | 0.00 | 0.00 |
| Military | B747-400 | 8,000 | 0.00 | 0.00 |
| External Library | B747-400ER | 6,000 | 0.00 | 0.00 |
| | B757-300 | 24,000 | 0.00 | 0.00 |
| | B767-400 ER | 16,000 | 0.00 | 0.00 |
| | B777-300 ER | 20,000 | 0.00 | 0.00 |

Aircraft Group

- Generic
- Airbus
- Boeing
- Other Commercial
- General Aviation
- Military
- External Library

Library Aircraft

- SWL-50
- Sngl Whl-3
- Sngl Whl-5
- Sngl Whl-10
- Sngl Whl-12.5
- Sngl Whl-15
- Sngl Whl-20
- Sngl Whl-30
- Sngl Whl-45
- Sngl Whl-60
- Sngl Whl-75
- Dual Whl-10
- Dual Whl-20
- Dual Whl-30
- Dual Whl-45
- Dual Whl-50
- Dual Whl-60
- Dual Whl-75
- Dual Whl-100

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Float Aircraft

- A320-100
- A340-600 std
- A340-600 std Belly
- A380-800
- B737-800
- B747-400
- B747-400ER
- B757-300

CDF columns and P/C ratio will be zero when airplanes are first entered

Save the list when finished entering airplanes then click the back button

FAARFIELD Flexible Pavement Design

Performing the Pavement Design

The layer with the small arrow is the layer that will be adjusted to provide the structural design

The location of the arrow is determined by the type of pavement structure

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| P-401 / P-403 HMA Surface | 5.00 | 200,000 |
| P-401 / P-403 St (flex) | 8.00 | 400,000 |
| P-209 CrAg | 10.00 | 75,000 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, $t = 23.00$ in

Status

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD Flexible Pavement Design

Layered Adjusted During Design

| PAVEMENT TYPE | LAYER ADJUSTED |
|---------------|---------------------|
| ACAggregate | P-154 Subbase |
| AConFlex | P-401 AC Overlay |
| AConRigid | P-401 AC Overlay |
| NewFlexible | P-209 subbase |
| NewRigid | PCC Surface |
| PCConFlex | PCC Overlay on Flex |
| PCConRigid | PCC Overlay Unbond |

For New flexible sections the arrow can be moved by double clicking next to the desired base or subbase layer during “modify design” mode.

FAARFIELD Flexible Pavement Design

Design Life

Click on the “des. Life” to change number of years for the design period.

When the pop-up box appears, enter the desired number of years.

NOTE: the standard FAA design is for 20 years

FAARFIELD - Modifying Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| | | 100,000 |
| | | 5,000 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, $t = 23.00$ in

Modifying Structure

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

Changing Pavement Life

Enter a new value for life in years. Life is always a whole number in the range: 1 to 50.

Click Cancel at any time to retain the old value.

OK Cancel

20

FAARFIELD Flexible Pavement Design

Performing the Pavement Design

You are now ready to design the structure. Simply click on "Design Structure"

The program will keep you informed about the status of the design

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 8.00 | 400,000 |
| → P-209 CrAg | 10.00 | 75,000 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, $t = 23.00$ in

Design Running 00:00:00

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD Flexible Pavement Design

Result of the Pavement Design

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| P-401 / P-403 HMA Surface | 5.00 | 200,000 |
| P-401 / P-403 St (flex) | 11.06 | 400,000 |
| P-209 CrAq | 18.78 | 51,438 |
| Subgrade | CBR = 8.0 | 12,000 |

N = 5; Sublayers; Subgrade CDF = 1.00; t = 34.84 in

Design Stopped
4.13; 3.31

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

The program will adjust the design layer until a CDF of 1.0 is achieved

FAARFIELD Flexible Pavement Design

Result of the Pavement Design

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| P-401 / P-403 HMA Surface | 5.00 | 200,000 |
| P-401 / P-403 St (flex) | 11.06 | 400,000 |
| P-209 Cr Aq | 18.78 | 51,438 |
| Subgrade | CBR = 8.0 | 12,000 |

N = 5; Sublayers; Subgrade CDF = 1.00; t = 34.84 in

Design Stopped
4.13; 3.31

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

The program has also determined the minimum base layer requirement

FAARFIELD Flexible Pavement Design

Reviewing Airplane Data After Completing the Design

CDF and P/C ratio information is now available

This information allows you to see which airplane have the largest impact on the pavement structure

FAARFIELD - Create or Modify Aircraft for Section NewFlexible in Job PROJECT

| Aircraft Group | Aircraft Name (11) | CDF Contribution | CDF Max for Aircraft | P/C Ratio | Pres |
|------------------|--------------------|------------------|----------------------|-----------|------|
| Generic | A340-600 std ... | 0.00 | 0.03 | 0.57 | |
| Airbus | A380-800 | 0.01 | 0.01 | 0.42 | |
| Boeing | B737-800 | 0.00 | 0.00 | 1.22 | |
| Other Commercial | B747-400 | 0.01 | 0.01 | 0.57 | |
| General Aviation | B747-400ER | 0.01 | 0.02 | 0.57 | |
| Military | B757-300 | 0.00 | 0.00 | 0.73 | |
| External Library | B767-400 ER | 0.04 | 0.05 | 0.60 | |
| | B777-300 ER | 0.86 | 0.86 | 0.40 | |
| | B787-8 | 0.03 | 0.03 | 0.57 | |

Library Aircraft

- SWL-50
- Sngl\Whl-3
- Sngl\Whl-5
- Sngl\Whl-10
- Sngl\Whl-12.5
- Sngl\Whl-15
- Sngl\Whl-20
- Sngl\Whl-30
- Sngl\Whl-45
- Sngl\Whl-60
- Sngl\Whl-75
- Dual\Whl-10
- Dual\Whl-20
- Dual\Whl-30
- Dual\Whl-45
- Dual\Whl-50
- Dual\Whl-60
- Dual\Whl-75
- Dual\Whl-100

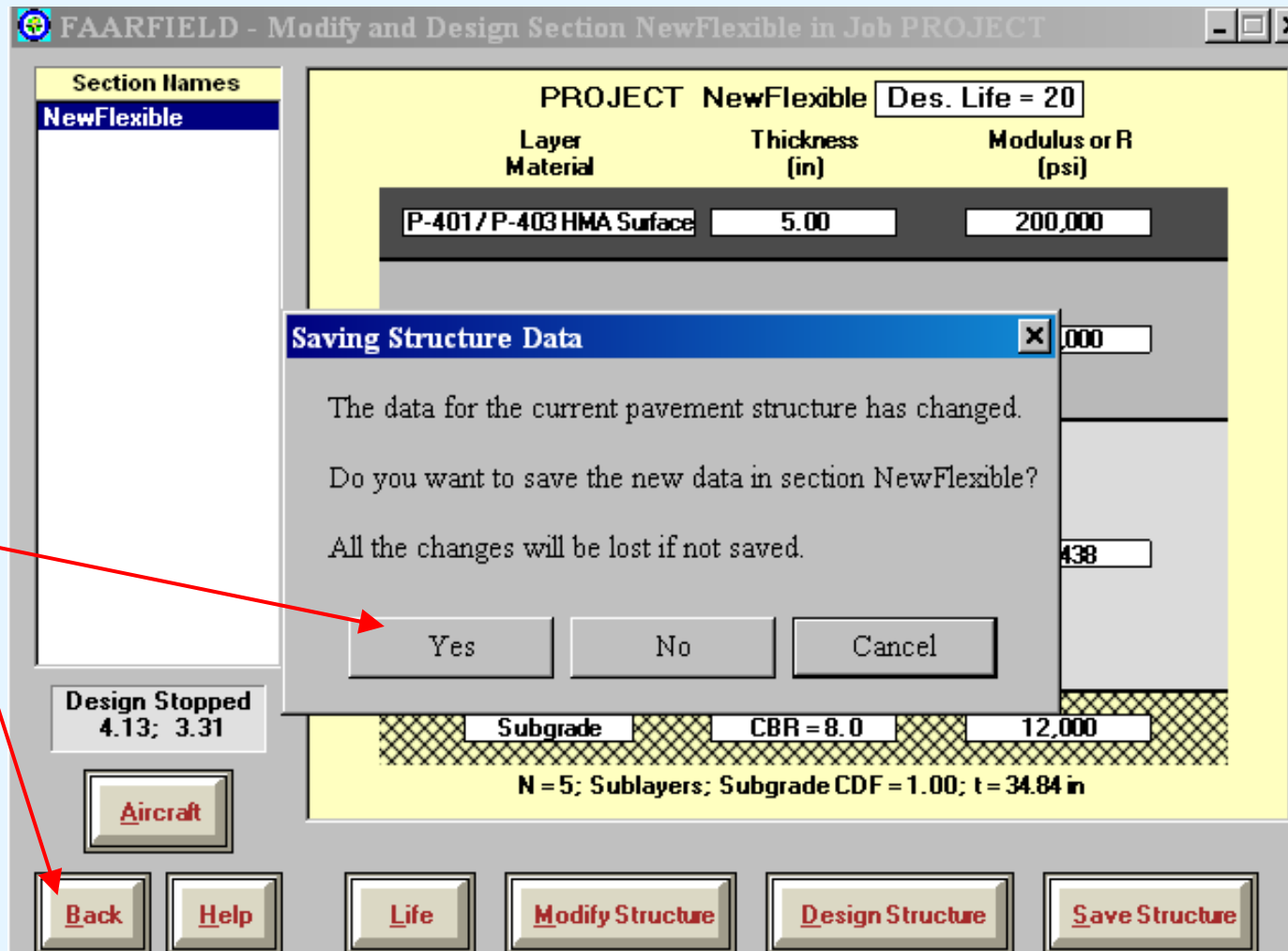
Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Float Aircraft

- A320-100
- A340-600 std
- A340-600 std Belly
- A380-800
- B737-800
- B747-400
- B747-400ER
- B757-300

FAARFIELD Flexible Pavement Design

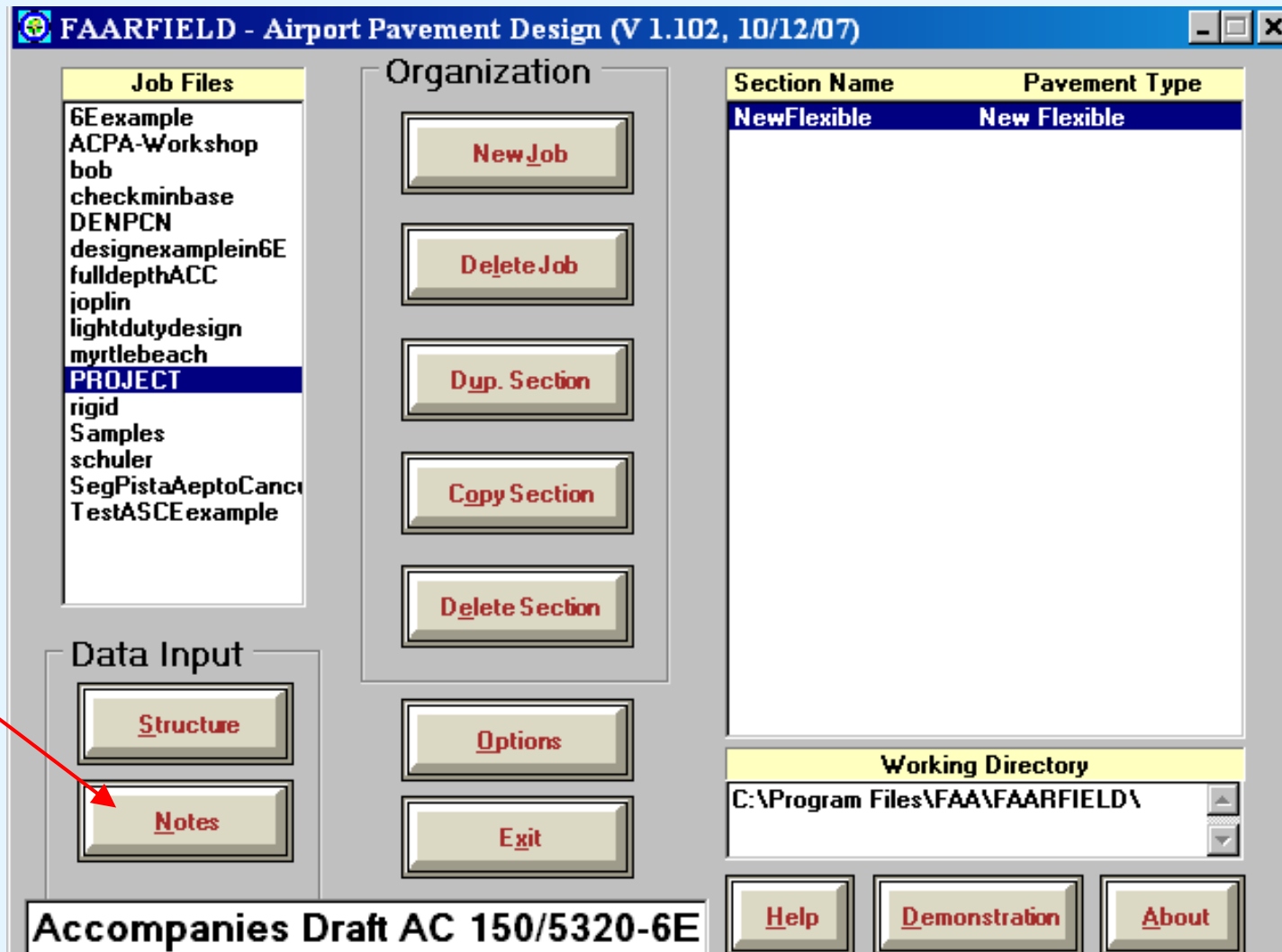
Saving and Reviewing the Pavement Design Data



When finished with the design, click the “Back” button and select whether you want to save the data

FAARFIELD Flexible Pavement Design

Reviewing Design Information



To view a summary of the design click the "Notes" button

FAARFIELD Flexible Pavement Design

Reviewing Design Information

You can view the summary data or copy it to other electronic media

Data can also be exported in XML to allow automated entry into FAA Form 5100

The screenshot displays the 'FAARFIELD - Notes and Information for Job PROJECT' window. On the left, a 'Section Names' list contains 'NewFlexible'. The main area shows 'Design Information for Section NewFlexible'.

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Section NewFlexible in Job PROJECT.
Working directory is C:\Program Files\FAA\FAARFIELD\

The structure is New Flexible. Asphalt CDF was not computed.
Design Life = 20 years.
A design for this section was completed on 01/24/08 at 10:56:16.

Pavement Structure Information by Layer, Top First

| No. | Type | Thickness in | Modulus psi | Poisson's Ratio | Strength R,psi |
|-----|-------------------------|--------------|-------------|-----------------|----------------|
| 1 | P-401/P-403 HMA Surface | 5.00 | 200,000 | 0.35 | 0 |
| 2 | P-401/P-403 St (flex) | 11.06 | 400,000 | 0.35 | 0 |
| 3 | P-209 Cr Ag | 18.78 | 51,438 | 0.35 | 0 |
| 4 | Subgrade | 0.00 | 12,000 | 0.35 | 0 |

Total thickness to the top of the subgrade = 34.84 in

Aircraft Information

| | Gross Wt | Annual | % Annual |
|--|----------|--------|----------|
| | | | |

At the bottom, there are buttons for 'Help', 'Back', 'SaveXML', 'Save', 'Print', 'Design Info', 'Notes', and 'Copy'. Red arrows point from the text on the left to these buttons: one to 'NewFlexible' in the list, one to 'SaveXML', and one to 'Copy'.

FAARFIELD Flexible Pavement Design

Reviewing Design Information

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Section NewFlexible in Job PROJECT.

Working directory is C:\Program Files\FAA\FAARFIELD\

The structure is New Flexible. Asphalt CDF was not computed.

Design Life = 20 years.

A design for this section was completed on 01/24/08 at 10:56:16.

Pavement Structure Information by Layer, Top First

| No. | Type | Thickness in | Modulus psi | Poisson's Ratio | Strength R,psi |
|-----|--------------------------|-----------------|----------------|--------------------|-------------------|
| 1 | P-401/ P-403 HMA Surface | 5.00 | 200,000 | 0.35 | 0 |
| 2 | P-401/ P-403 St (flex) | 11.06 | 400,000 | 0.35 | 0 |
| 3 | P-209 Cr Ag | 18.78 | 51,438 | 0.35 | 0 |
| 4 | Subgrade | 0.00 | 12,000 | 0.35 | 0 |

Total thickness to the top of the subgrade = 34.84 in

Aircraft Information

| No. | Name | Gross Wt. lbs | Annual Departures | % Annual Growth | CDF Contribution | CDF Max for Aircraft | P/C Ratio |
|-----|--------------------|------------------|----------------------|--------------------|---------------------|-------------------------|--------------|
| 1 | A320-100 | 150,796 | 600 | 0.00 | 0.00 | 0.00 | 1.21 |
| 2 | A340-600 std | 805,128 | 1,000 | 0.00 | 0.04 | 0.05 | 0.59 |
| 3 | A340-600 std Belly | 805,128 | 1,000 | 0.00 | 0.00 | 0.03 | 0.57 |
| 4 | A380-800 | 1,239,000 | 300 | 0.00 | 0.01 | 0.01 | 0.42 |
| 5 | B737-800 | 174,700 | 2,000 | 0.00 | 0.00 | 0.00 | 1.22 |
| 6 | B747-400 | 877,000 | 400 | 0.00 | 0.01 | 0.01 | 0.57 |
| 7 | B747-400ER | 913,000 | 300 | 0.00 | 0.01 | 0.02 | 0.57 |
| 8 | B757-300 | 271,000 | 1,200 | 0.00 | 0.00 | 0.00 | 0.73 |
| 9 | B767-400 ER | 451,000 | 800 | 0.00 | 0.04 | 0.05 | 0.60 |
| 10 | B777-300 ER | 777,000 | 1,000 | 0.00 | 0.86 | 0.86 | 0.40 |
| 11 | B787-8 | 478,000 | 600 | 0.00 | 0.03 | 0.03 | 0.57 |

FAARFIELD Flexible Pavement Design

Reviewing Design Information

Notice the
Statement
“Asphalt CDF was
not computed”

This means the
design assumed
the failure was in
the subgrade and
did not calculate
the fatigue in the
bottom of the
asphalt layer

FAARFIELD - Notes and Information for Job PROJECT

Section Names
NewFlexible

Design Information for Section NewFlexible

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

Section NewFlexible in Job PROJECT.
Working directory is C:\Program Files\FAA\FAARFIELD\

The structure is New Flexible. Asphalt CDF was not computed.
Design Life = 20 years.
A design for this section was completed on 01/24/06 at 10:56:16.

Pavement Structure Information by Layer, Top First

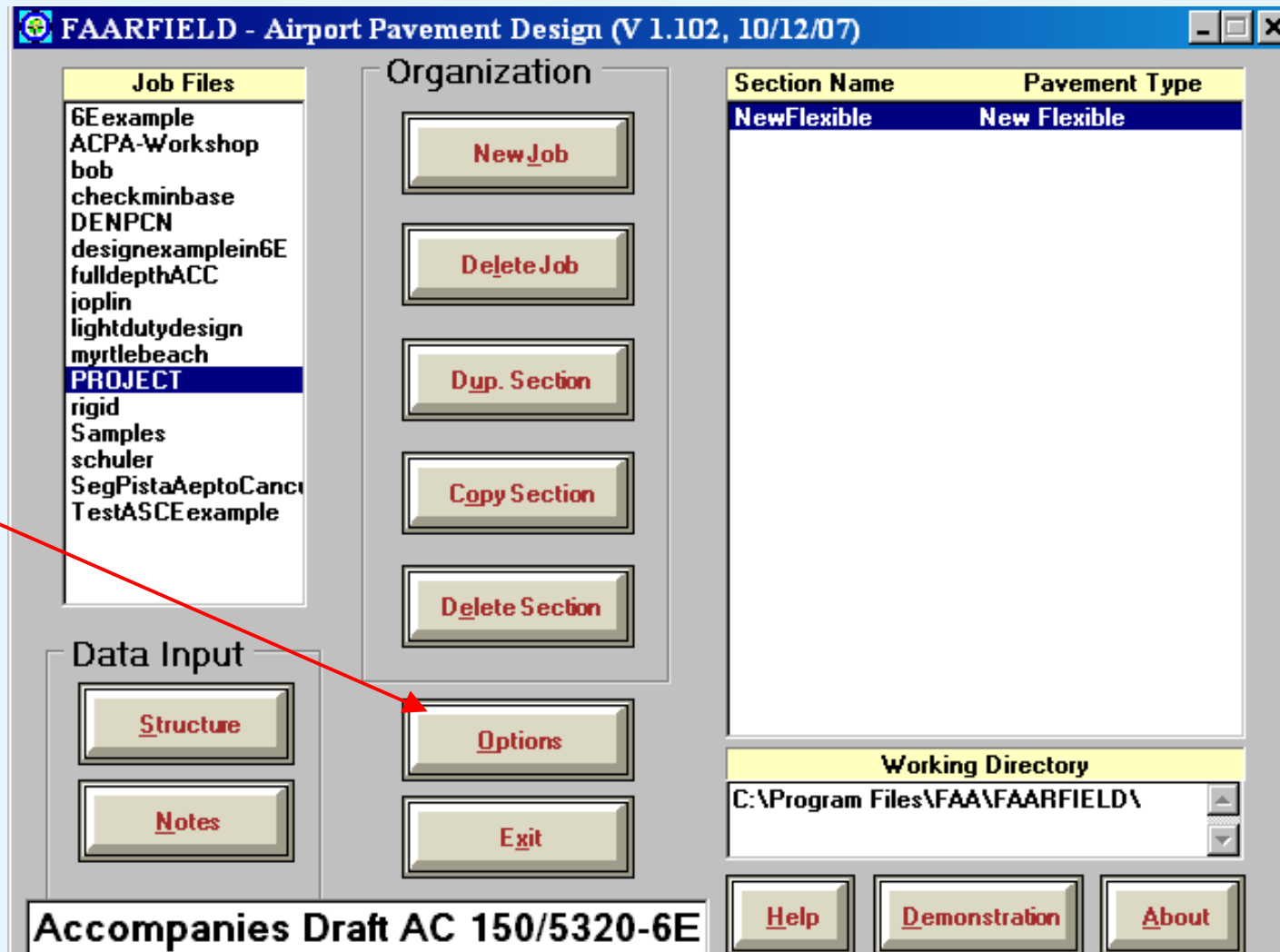
| No. | Type | Thickness in | Modulus psi | Poisson's Ratio | Strength R,psi |
|-----|-------------------------|-----------------|----------------|--------------------|-------------------|
| 1 | P-401/P-403 HMA Surface | 5.00 | 200,000 | 0.35 | 0 |
| 2 | P-401/P-403 St (flex) | 11.06 | 400,000 | 0.35 | 0 |
| 3 | P-209 Cr Ag | 18.78 | 51,438 | 0.35 | 0 |
| 4 | Subgrade | 0.00 | 12,000 | 0.35 | 0 |

Total thickness to the top of the subgrade = 34.84 in

FAARFIELD Flexible Pavement Design

Calculating Fatigue in the Asphalt Layer

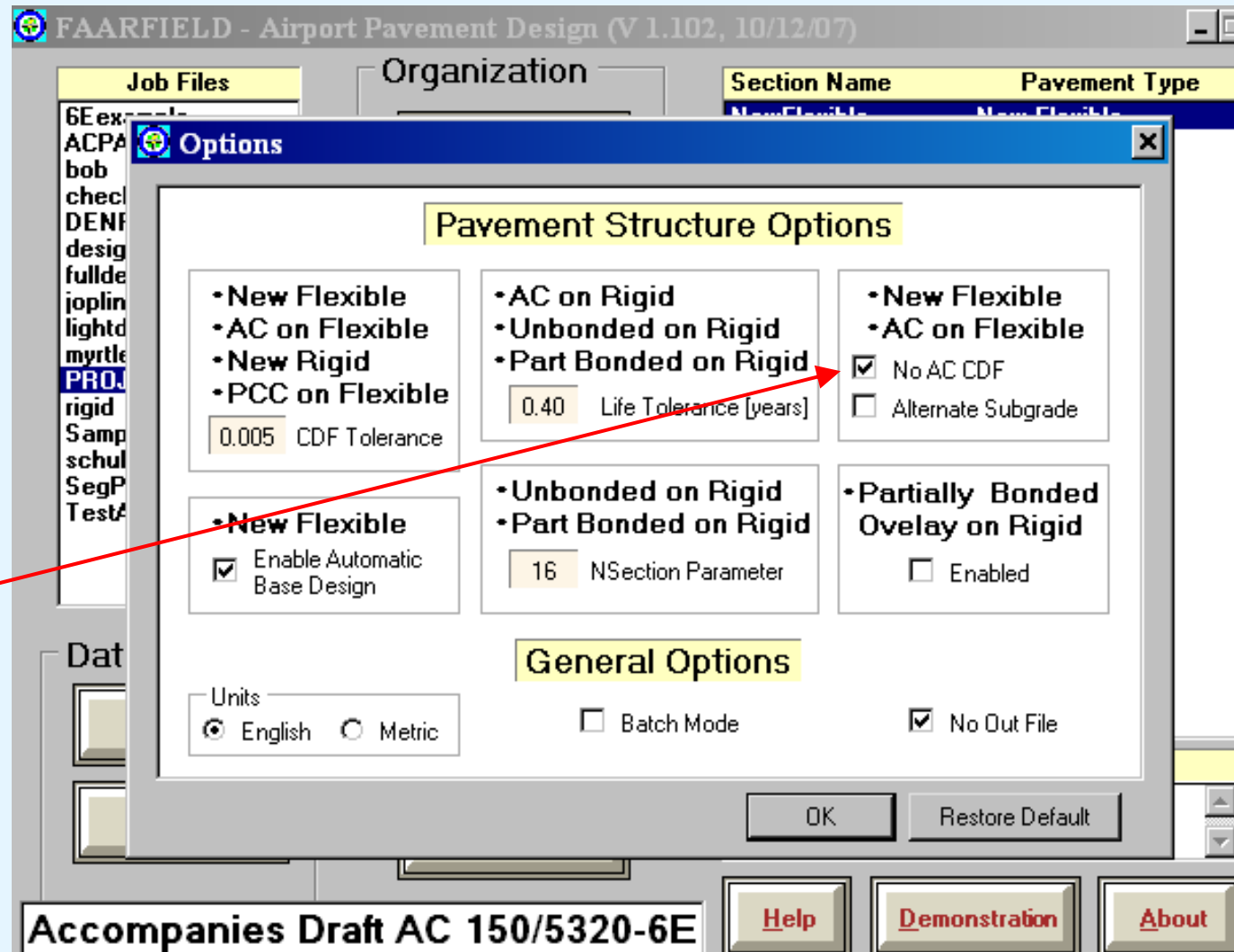
By clicking the options box the user can access the optional program features including the Asphalt layer CDF



FAARFIELD Flexible Pavement Design

Calculating Fatigue in the Asphalt Layer

If you want the program to calculate the asphalt fatigue un-check the box and re-run the design



FAARFIELD Flexible Pavement Design

Calculating Fatigue in the Asphalt Layer

As this example demonstrates, the controlling feature is almost always the subgrade

i.e. subgrade CDF reaches 1.0 while the AC CDF is still 0.0

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 11.06 | 400,000 |
| P-209 CrAg | 18.78 | 51,438 |
| Subgrade | CBR = 8.0 | 12,000 |

→

Design Stopped 11.05; 6.01

Aircraft

N=1; AC CDF = 0.00; Sublayers; Subgrade CDF = 1.00; t = 34.84 in

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD Flexible Pavement Design

Minimum Base Course Requirements

- **FAARFIELD will automatically determine the minimum base layer requirements.**
- **Users can do this step manually if desired by deselecting this option**
 - Remove subbase layer and increase subgrade CBR to 20.
 - Re-run the design to obtain the minimum base thickness

FAARFIELD Flexible Pavement Design

Determine Minimum Base Thickness

Click on “Modify Structure”

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 8.00 | 400,000 |
| P-209 CrAg | 18.78 | 51,438 |
| Subgrade | CBR = 8.0 | 12,000 |

→

Total thickness to the top of the subgrade, $t = 31.78$ in

Design Stopped
11.05; 6.01

Aircraft

Back Help Life **Modify Structure** Design Structure Save Structure

FAARFIELD Flexible Pavement Design

Determine Minimum Base Thickness

FAARFIELD - Modifying Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 8.00 | 400,000 |
| P-209 CrAg | 18.78 | 51,438 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, $t = 31.78$ in

Click on "Add/Delete Layer"

Modifying Structure

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

FAARFIELD Flexible Pavement Design

Determine Minimum Base Thickness

FAARFIELD - Modifying Section NewFlexible in Job PROJECT

Section Names
NewFlexible

Select the layer to be added or deleted by clicking the mouse on the layer. The bottom layer cannot be selected.

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 8.00 | 400,000 |
| P-209 CrAg | 18.78 | 51,438 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, $t = 31.78$ in

Design Stopped 11.05; 6.01

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

Click on the
subbase layer

FAARFIELD Flexible Pavement Design

Determine Minimum Base Thickness

Check the delete
option
Then click OK

FAARFIELD - Modifying Section NewFlexible in Job PROJECT

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|----------------------|----------------|--------------------|
| / P-403 HMA Surface | 5.00 | 200,000 |
| 01 / P-403 St (flex) | 8.00 | 400,000 |
| P-209 CrAg | 18.78 | 51,438 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, $t = 31.78$ in

Design Stopped 11.05; 6.01

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

Add or Delete a Layer

☐ Add

A new layer is added by duplicating an existing layer. Add a new layer identical to the selected layer by clicking OK when the Add button is selected.

☒ Delete

Delete the selected layer by clicking OK when the Delete button is selected.

OK Cancel

FAARFIELD Flexible Pavement Design

Determine Minimum Base Thickness

Change the P-401
Stabilized layer to
P-209

Increase the
subgrade CBR to
20

Then click “End
Modify”

FAARFIELD - Modifying Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| P-401 / P-403 HMA Surface | 5.00 | 200,000 |
| P-401 / P-403 St (flex) | 8.00 | 400,000 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, t = 13.00 in

Design Stopped 11.05; 6.01

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

FAARFIELD Flexible Pavement Design

Determine Minimum Base Thickness

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-209 CrAg | 8.00 | 75,000 |
| Non-Standard Structure | | |
| Subgrade | CBR = 20.0 | 30,000 |

Total thickness to the top of the subgrade, $t = 13.00$ in

Design Stopped 11.05; 6.01

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

Click "Design Structure"

FAARFIELD Flexible Pavement Design

Determine Minimum Base Thickness

The minimum P-209 Base thickness is that necessary to protect the CBR 20 subbase material

Now convert P-209 to stabilize material

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| P-401 / P-403 HMA Surface | 5.00 | 200,000 |
| P-209 CrAg | 17.70 | 75,196 |
| Non-Standard Structure | | |
| Subgrade | CBR = 20.0 | 30,000 |

N = 5; AC CDF = 0.19; Sublayers; Subgrade CDF = 1.00; t = 22.70 in

Design Stopped 5.98; 3.98

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD Flexible Pavement Design

Determine Minimum Base Thickness

17.7 inches of P-209 is converted to Stabilized Base

For this example use P-401 as stabilized material

$$T_{401\text{Base}} = T_{\text{P209}} / 1.6 \quad (1.6 \text{ is provided in 5320-6E})$$

$$T_{401\text{Base}} = 17.7 / 1.6 = 11.0625 \quad \text{say } 11.0$$

FAARFIELD Flexible Pavement Design

Determine Minimum Base Thickness

- Reconstruct the pavement section
- Stabilized P-401 base at 11 inches
- P-209 as the improved subbase material
- CBR returned to design value

Click "End Modify"

FAARFIELD - Modifying Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| P-401 / P-403 HMA Surface | 5.00 | 200,000 |
| P-401 / P-403 St (flex) | 11.00 | 400,000 |
| P-209 CrAg | 17.70 | 75,196 |
| Subgrade | CBR = 8.0 | 12,000 |

N = 5; AC CDF = 0.19; Sublayers; Subgrade CDF = 1.00; t = 33.70 in

Design Stopped 5.98; 3.98

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

FAARFIELD Flexible Pavement Design

Determine Minimum Base Thickness

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 11.00 | 400,000 |
| P-209 Cr Ag | 17.70 | 75,196 |
| Subgrade | CBR = 8.0 | 12,000 |

N = 5; AC CDF = 0.19; Sublayers; Subgrade CDF = 1.00; t = 33.70 in

Design Stopped
5.98; 3.98

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

Then click "Design Structure"

FAARFIELD Flexible Pavement Design

Determine Minimum Base Thickness

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names
NewFlexible

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 11.06 | 400,000 |
| P-209 Cr Ag | 18.79 | 51,446 |
| Subgrade | CBR = 8.0 | 12,000 |

N = 2; AC CDF = 0.00; Sublayers; Subgrade CDF = 1.00; t = 34.85 in

Design Stopped
9.33; 5.80

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

The final pavement requirements are now visible

FAARFIELD - Sample HMA Overlay Design

Overlay design is very similar to new pavement design except that the design is only allowed to iterate on the overlay layer

The steps and options are similar to that of a new flexible design



FAARFIELD - Sample HMA Overlay Design

4 Basic Overlay Structures in FAARFIELD

| Section Name Pavement Type | |
|-----------------------------------|---|
| AConFlex | Asphalt overlay on Flexible pavement |
| AConRigid | Asphalt overlay on Rigid pavement |
| PConFlex | PCC overlay on flexible |
| PConRigid | Unbonded PCC on rigid |

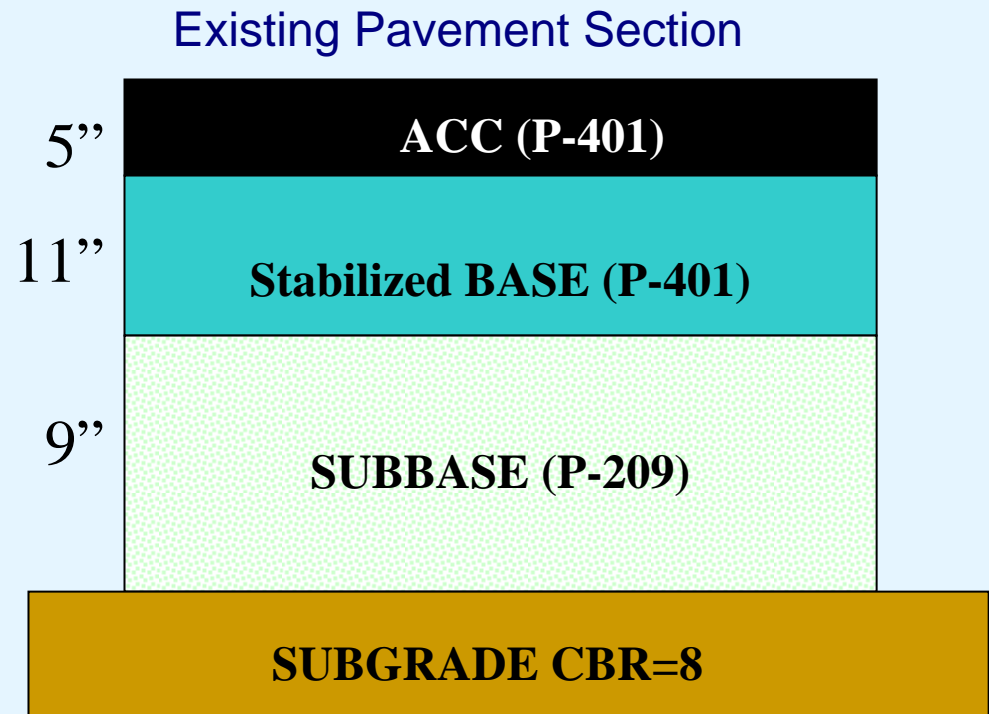
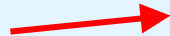
FAARFIELD - Sample HMA Overlay Design

Assume the previous design example except that the existing structure is ~10 inches deficient in the subbase layer.

AConflex

Asphalt on existing flexible pavement

Original design
required 18.8 inches
of P-209



FAARFIELD - Sample HMA Overlay Design

Create Existing Pavement Section for Overlay Design

Copy the original
pavement section –
go to “Modify
Structure”

FAARFIELD - Airport Pavement Design (V 1.102, 10/12/07)

| Job Files | Organization | Section Name | Pavement Type |
|---|---|--------------|---------------|
| 6Eexample ACPA-Workshop bob checkminbase DENPCN designexamplein6E fulldepthACC joplin lightdutydesign myrtlebeach PROJECT rigid Samples schuler SegPistaAeptoCanc TestASCEexample | New Job Delete Job Dup. Section Copy Section Delete Section | NewFlexible | New Flexible |

Data Input

Structure
Notes

Options
Exit

Working Directory
C:\Program Files\FAA\FAARFIELD\

Help
Demonstration
About

Accompanies Draft AC 150/5320-6E

FAARFIELD - Sample HMA Overlay Design

Create Existing Pavement Section for Overlay Design

Start with the original pavement section – go to “Modify Structure”

FAARFIELD - Modify and Design Section Overlay in Job PROJECT

Section Names
NewFlexible
Overlay

PROJECT Overlay Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| P-401 / P-403 HMA Surface | 5.00 | 200,000 |
| P-401 / P-403 St (flex) | 11.06 | 400,000 |
| P-209 CrAg | 18.79 | 51,446 |
| Subgrade | CBR = 8.0 | 12,000 |

→

Total thickness to the top of the subgrade, $t = 34.85$ in

Design Stopped 9.33; 5.80

Aircraft

Back Help Life **Modify Structure** Design Structure Save Structure

FAARFIELD - Sample HMA Overlay Design

Create Existing Pavement Section for Overlay Design

Click on the subbase thickness and enter 9.0 to establish the existing pavement structure

FAARFIELD - Modifying Section Overlay in Job PROJECT

Section Names
NewFlexible
Overlay

PROJECT Overlay Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|----------------|----------------|--------------------|
| | | 200,000 |
| | | 400,000 |
| | | |
| → P-209 CrAq | 18.79 | 51,446 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, $t = 34.85$ in

Design Stopped 9.33, 5.80

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

Ag Crushed Layer Thickness

Enter the new thickness in in and click OK or press the Enter key on the keyboard.

Click Cancel at any time to retain the old value of thickness.

OK Cancel

9.0

Then click on "Add/Delete Layer"

FAARFIELD - Sample HMA Overlay Design

Create Overlay Layer

Click on the P401
surface layer to
add a section layer

FAARFIELD - Modifying Section Overlay in Job PROJECT

Section Names
NewFlexible
Overlay

Select the layer to be added or deleted by clicking the mouse on the layer. The bottom layer cannot be selected.

Design Stopped
9.33; 5.80

Aircraft

Back Help Life End Modify Add/Delete Layer Save Structure

PROJECT Overlay Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| P-401 / P-403 HMA Surface | 5.00 | 200,000 |
| P-401 / P-403 St (flex) | 11.06 | 400,000 |
| P-209 CrAg | 9.00 | 51,446 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, t = 25.06 in

FAARFIELD - Sample HMA Overlay Design

Create Overlay Layer

Click on the top layer and change its properties to Asphalt P-401 Overlay

Then click on "End Modify" to return to design mode

FAARFIELD - Modifying Section Overlay in Job PROJECT

Section Names

- NewFlexible Overlay

PROJECT Overlay Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| P-401 / P-403 HMA Surface | 5.00 | 200,000 |

Layer Type Selection

- ☐ Undefined
- ☐ Subgrade
- Aggregate
 - ☐ P-208 (see Note)
 - ☐ P-209 Crushed
 - ☐ P-154 Uncrushed
- HMA: All P-401 / P-403
 - ☐ Surface
 - ☒ Overlay
- Stabilized (flexible)
 - ☐ Variable
 - ☐ P-401 / P-403 HMA

PCC: All P-501

- ☐ Surface
- ☐ Overlay fully unbonded
- ☐ Overlay partially bonded
- ☐ Overlay on flexible

Stabilized (rigid)

- ☐ Variable
- ☐ P-301 Soil Cement Base
- ☐ P-304 Cement Treated Base
- ☐ P-306 Econocrete Subbase
- ☐ Rubblized PCC Base

Design Stopped 9.33; 5.80

Aircraft

OK Cancel

Back Help Life End Modify Add/Delete Layer Save Structure

FAARFIELD - Sample HMA Overlay Design

Create Overlay Layer

FAARFIELD - Modify and Design Section Overlay in Job PROJECT

Section Names

NewFlexible
Overlay

PROJECT Overlay Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Overlay | 5.00 | 200,000 |
| P-401/P-403 HMA Surface | 5.00 | 200,000 |
| P-401/P-403 St (flex) | 11.06 | 400,000 |
| P-209 CrAg | 9.00 | 51,446 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, $t = 30.06$ in

Design Stopped 9.33; 5.80

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

Notice the arrow has relocated to the overlay layer

You may confirm or modify the airplane information

Then click "Design Structure" to complete the design

FAARFIELD - Sample HMA Overlay Design

Create Overlay Layer

FAARFIELD - Modify and Design Section Overlay in Job PROJECT

Section Names
NewFlexible
Overlay

PROJECT Overlay Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-----------------------------|----------------|--------------------|
| → P-401 / P-403 HMA Overlay | 5.50 | 200,000 |
| P-401 / P-403 HMA Surface | 5.00 | 200,000 |
| P-401 / P-403 St (flex) | 11.06 | 400,000 |
| P-209 CrAg | 9.00 | 34,372 |
| Subgrade | CBR = 8.0 | 12,000 |

N = 1; AC CDF = 0.00; Subgrade CDF = 1.00; t = 30.56 in

Design Stopped
4.77; 0.51

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

The final overlay thickness is 5.5 inches

FAARFIELD - Sample HMA Overlay Design

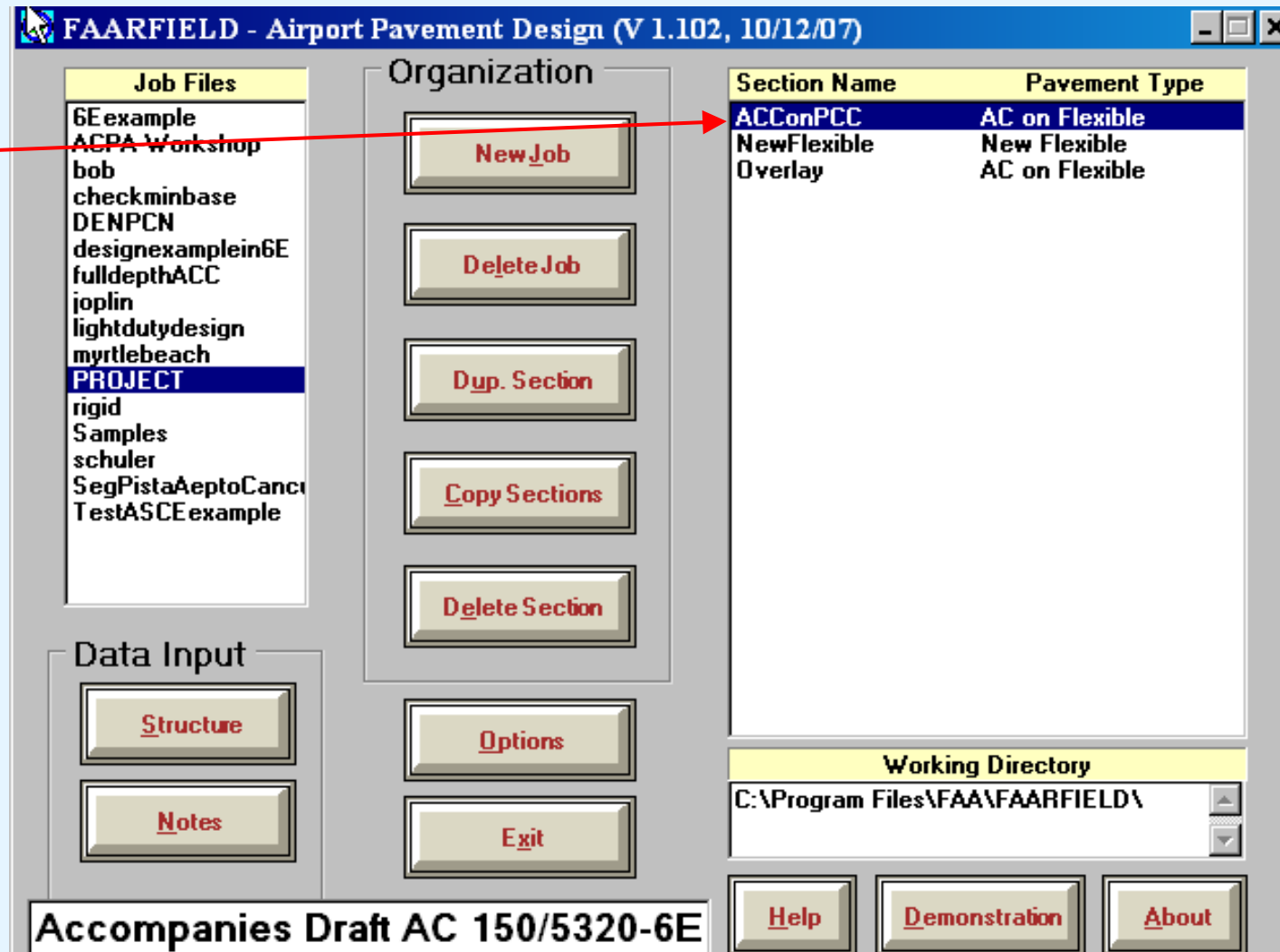
Overlay Design

Asphalt over Rigid Pavement

FAARFIELD - Sample HMA Overlay Design

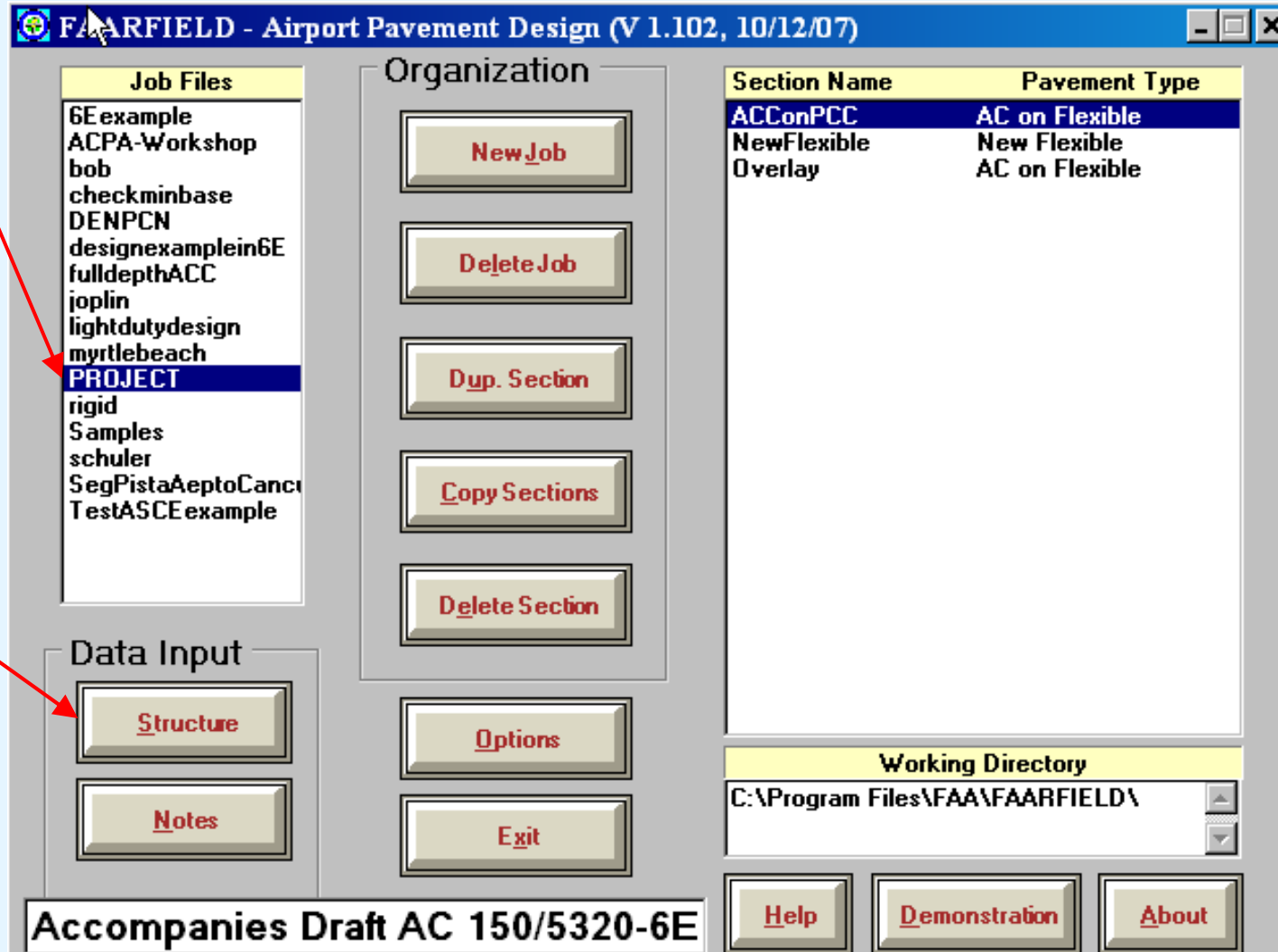
Asphalt Over Rigid Pavement – Overlay Design

Create a new Section using the default samples or copying existing sections.



FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design



Select the Job file

Then open the structure

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design

The new section may not automatically include the traffic mixture used for other sections.

You can copy the entire traffic mixture from a previous section to save time and effort.

FAARFIELD - Modify and Design Section ACConPCC in Job PROJECT

Section Names

- ACConPCC
- NewFlexible Overlay

PROJECT ACConPCC Des. Life = 2 SCI = 67 %CDFU = 100

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| → P-401/P-403 HMA Overlay | 4.00 | 200,000 |
| PCC Surface | 16.00 | 700 |
| Non-Standard Life | | |
| P-304 CTB | 6.00 | 500,000 |
| P-209 CrAg | 9.00 | 29,397 |
| Subgrade | k = 100.0 | 9,616 |

Total thickness to the top of the subgrade, t = 35.00 in

Design Stopped
304.44; 263.27

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design

FAARFIELD - Modify and Design Section NewFlexible in Job PROJECT

Section Names

- ACConPCC
- NewFlexible**
- Overlay

PROJECT NewFlexible Des. Life = 20

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| P-401 / P-403 HMA Surface | 5.00 | 200,000 |
| P-401 / P-403 St (flex) | 11.06 | 400,000 |
| P-209 CrAq | 18.79 | 51,446 |
| Subgrade | CBR = 8.0 | 12,000 |

Total thickness to the top of the subgrade, $t = 34.85$ in

Design Stopped 4.77; 0.51

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

Select the section containing the traffic mixture you want to copy

Click "Aircraft"

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design

Click on “Save to Float” to copy the entire airplane list to the Float (like a clipboard)

FAARFIELD - Create or Modify Aircraft for Section NewFlexible in Job PROJECT

| Aircraft Group | Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth | 1 |
|------------------|--------------------|-------------------------|-------------------|-----------------|---|
| Generic | A340-600 std ... | 805,128 | 1,000 | 0.00 | 2 |
| Airbus | A380-800 | 1,239,000 | 300 | 0.00 | 6 |
| Boeing | B737-800 | 174,700 | 2,000 | 0.00 | 4 |
| Other Commercial | B747-400 | 877,000 | 400 | 0.00 | 8 |
| General Aviation | B747-400ER | 913,000 | 300 | 0.00 | 6 |
| Military | B757-300 | 271,000 | 1,200 | 0.00 | 2 |
| External Library | B767-400 ER | 451,000 | 800 | 0.00 | 1 |
| | B777-300 ER | 777,000 | 1,000 | 0.00 | 2 |
| | B787-8 | 478,000 | 600 | 0.00 | 1 |

Library Aircraft

SWL-50

Sngl Whl-3

Sngl Whl-5

Sngl Whl-10

Sngl Whl-12.5

Sngl Whl-15

Sngl Whl-20

Sngl Whl-30

Sngl Whl-45

Sngl Whl-60

Sngl Whl-75

Dual Whl-10

Dual Whl-20

Dual Whl-30

Dual Whl-45

Dual Whl-50

Dual Whl-60

Dual Whl-75

Dual Whl-100

Add

Remove

Save List

Clear List

Save to Float

Add Float

Back

Help

View Gear

Float Aircraft

A320-100

A340-600 std

A340-600 std Belly

A380-800

B737-800

B747-400

B747-400ER

B757-300

Click “Back”

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design

LEDFAA - Modify and Design Section AConRigid in Job ASCE-Project

Section Names

- AConRigid
- NewFlexible
- OverlaySect

CE-Project AConRigid Des. Life = 20 SCI = 50 %CDFU = 100

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------|----------------|--------------------|
| P-401 AC Overlay | 12.00 | 200,000 |
| PCC Surface | 14.00 | 700 |
| Variable St (rigid) | 6.00 | 250,000 |
| P-209 Cr Ag | 6.00 | 75,000 |
| Subgrade | k = 141.4 | 15,000 |

Total thickness to the top of the subgrade, t = 38.00 in

Status

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

Select the new overlay section

Then click "Aircraft"

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design

FAARFIELD - Create or Modify Aircraft for Section ACConPCC in Job PROJECT

| Aircraft Group | Aircraft Name (3) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth | Total Departures |
|------------------|-------------------|-------------------------|-------------------|-----------------|------------------|
| Generic | B737-500 | 134,000 | 1,200 | 0.00 | 2,400 |
| Airbus | Challenger-CL... | 48,200 | 1,200 | 0.00 | 2,400 |
| Boeing | Chk.Arrow-PA... | 2,500 | 1,200 | 0.00 | 2,400 |
| Other Commercial | | | | | |
| General Aviation | | | | | |
| Military | | | | | |
| External Library | | | | | |

Library Aircraft

- Aztec-D
- Baron-E-55
- BeechJet-400
- BeechJet-400A
- Bonanza-F-33A
- Canadair-CL-215
- Centurion-210
- Challenger-CL-604
- Chancellor-414
- Chk.Arrow-PA-28-200
- Chk.Six-PA-32
- Citation-525
- Citation-550B
- Citation-V
- Citation-VI/VII
- Citation-X
- Conquest-441
- DC-3
- Falcon-50

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Float Aircraft

Click on “Clear List” to remove any existing airplanes from the section.

Then click on “Add Float” to add the Float list to the section

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design

FAARFIELD - Create or Modify Aircraft for Section ACConPCC in Job PROJECT

| Aircraft Group | Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth | Taxi Dep |
|------------------|--------------------|-------------------------|-------------------|-----------------|----------|
| Generic | A340-600 std ... | 805,128 | 1,000 | 0.00 | 2 |
| Airbus | A380-800 | 1,239,000 | 300 | 0.00 | |
| Boeing | B737-800 | 174,700 | 2,000 | 0.00 | 4 |
| Other Commercial | B747-400 | 877,000 | 400 | 0.00 | |
| General Aviation | B747-400ER | 913,000 | 300 | 0.00 | |
| Military | B757-300 | 271,000 | 1,200 | 0.00 | 2 |
| External Library | B767-400 ER | 451,000 | 800 | 0.00 | 1 |
| | B777-300 ER | 777,000 | 1,000 | 0.00 | 2 |
| | B787-8 | 478,000 | 600 | 0.00 | 1 |

Library Aircraft

- Aztec-D
- Baron-E-55
- BeechJet-400
- BeechJet-400A
- Bonanza-F-33A
- Canadair-CL-215
- Centurion-210
- Challenger-CL-604
- Chancellor-414
- Chk.Arrow-PA-28-200
- Chk.Six-PA-32
- Citation-525
- Citation-550B
- Citation-V
- Citation-VI/VII
- Citation-X
- Conquest-441
- DC-3
- Falcon-50

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Float Aircraft

- A320-100
- A340-600 std
- A340-600 std Belly
- A380-800
- B737-800
- B747-400
- B747-400ER
- B757-300

The updated list is now visible. You can modify the list if necessary

Once you are satisfied with the airplane list click "Save List" and "Back"

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design

FAARFIELD - Modify and Design Section ACConPCC in Job PROJECT

Section Names

ACConPCC
NewFlexible
Overlay

PROJECT ACConPCC Des. Life = 20 SCI = 67 %CDFU = 100

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| → P-401/P-403 HMA Overlay | 5.00 | 200,000 |
| PCC Surface | 16.00 | 700 |
| P-304 CTB | 6.00 | 500,000 |
| P-209 CrAg | 9.00 | 29,397 |
| Subgrade | k = 100.0 | 9,616 |

Total thickness to the top of the subgrade, t = 36.00 in

Design Stopped
304.44; 263.27

Aircraft

Back Help Life **Modify Structure** Design Structure Save Structure

You may need to modify the sample section to accurately mimic your existing pavement section

Using the same procedures as before to modify the section

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design

FAARFIELD - Modify and Design Section ACConPCC in Job PROJECT

Section Names

ACConPCC
NewFlexible
Overlay

PROJECT ACConPCC Des. Life = 20 SCI = 67 %CDFU = 100

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Overlay | 5.00 | 200,000 |
| PCC Surface | 16.00 | 700 |
| P-304 CTB | 6.00 | 500,000 |
| P-209 CrAg | 9.00 | 29,397 |
| Subgrade | k = 100.0 | 9,616 |

Total thickness to the top of the subgrade, t = 36.00 in

Design Stopped
304.44; 263.27

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

You will notice two new variables in the design window

SCI

%CDFU

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design

SCI – Structural Condition Index

A measure of the structure condition of the existing pavement structure.

Summation of structural components from PCI Distress Survey

SCI range 0 (complete failure) – 100 (no distress)

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design

CDFU = Cumulative Damage Factor Used

When $SCI = 100$, you must identify the percentage of pavement life that has already been consumed i.e. CDFU

$$\begin{aligned} CDFU &= \frac{L_U}{0.75 L_D} \quad \text{when } L_U < 0.75 L_D \\ &= 1 \quad \text{when } L_U \geq 0.75 L_D \end{aligned}$$

L_U = number of years of operation of the existing pavement until overlay

L_D = design life of the existing pavement in years

To calculate CDFU – create original structure, create traffic applied to this point, use “Life” button

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design Calculate CDFU

Overlay removed
to create original
structure

Design Life
changed to 4 years
to estimate in-
service life.

Click on “Aircraft”
to enter historic
traffic mixture

FAARFIELD - Modify and Design Section ACConPCC in Job PROJECT

Section Names
ACConPCC
NewFlexible
Overlay

PROJECT ACConPCC Des. Life = 4

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------|----------------|--------------------|
| PCC Surface | 16.00 | 700 |
| Non-Standard Life | | |
| P-304 CTB | 6.00 | 500,000 |
| P-209 CrAg | 9.00 | 29,397 |
| Subgrade | k = 100.0 | 9,616 |

Total thickness to the top of the subgrade, t = 31.00 in

Design Stopped
304.44; 263.27

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design Calculate CDFU

For this example
assume the B777,
B787, A340 and
A380 are not in the
historic traffic mix.
Remove these
airplanes.

FAARFIELD - Create or Modify Aircraft for Section ACConPCC in Job PROJECT

| Aircraft Group | Aircraft Name (11) | Gross Taxi Weight (lbs) | Annual Departures | % Annual Growth | Taxi Dep |
|------------------|--------------------|-------------------------|-------------------|-----------------|----------|
| Generic | A340-600 std ... | 805,128 | 1,000 | 0.00 | 1 |
| Airbus | A380-800 | 1,239,000 | 300 | 0.00 | 3 |
| Boeing | B737-800 | 174,700 | 2,000 | 0.00 | 2 |
| Other Commercial | B747-400 | 877,000 | 400 | 0.00 | 4 |
| General Aviation | B747-400ER | 913,000 | 300 | 0.00 | 3 |
| Military | B757-300 | 271,000 | 1,200 | 0.00 | 1 |
| External Library | B767-400 ER | 451,000 | 800 | 0.00 | 8 |
| | B777-300 ER | 777,000 | 1,000 | 0.00 | 1 |
| | B787-8 | 478,000 | 600 | 0.00 | 6 |

Library Aircraft

- SWL-50
- Sngl Whl-3
- Sngl Whl-5
- Sngl Whl-10
- Sngl Whl-12.5
- Sngl Whl-15
- Sngl Whl-20
- Sngl Whl-30
- Sngl Whl-45
- Sngl Whl-60
- Sngl Whl-75
- Dual Whl-10
- Dual Whl-20
- Dual Whl-30
- Dual Whl-45
- Dual Whl-50
- Dual Whl-60
- Dual Whl-75
- Dual Whl-100

Buttons: Add, Remove, Save List, Clear List, Save to Float, Add Float, Back, Help, View Gear

Float Aircraft

- A320-100
- A340-600 std
- A340-600 std Belly
- A380-800
- B737-800
- B747-400
- B747-400ER
- B757-300

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design Calculate CDFU

Click the “Life”
button and the
%CDFU for this
pavement
structure and the
historic traffic will
be displayed

%CDFU = 94.7%
indicates that the
pavement life is
mostly consumed.
Enter this value for
CDFU before
design

FAARFIELD - Modify and Design Section ACConPCC in Job PROJECT

Section Names
ACConPCC
NewFlexible
Overlay

PROJECT ACConPCC Des. Life = 4

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------|----------------|--------------------|
| PCC Surface | 16.00 | 700 |
| Non-Standard Life | | |
| P-304 CTB | 6.00 | 500,000 |
| P-209 CrAg | 9.00 | 29,397 |
| Subgrade | k = 100.0 | 9,616 |

Life Stopped
27.43; 27.30

Aircraft

%CDFU = 94.74; PCC CDF = 0.55; StrLife (PCC) = 7.3 yrs; t = 31.00 in

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design

Return to original overlay section

Restore original traffic mixture

Adjust SCI and %CDFU

Click on “Design Structure” to complete the overlay design

FAARFIELD - Modify and Design Section ACConPCC in Job PROJECT

Section Names

- ACConPCC
- NewFlexible Overlay

PROJECT ACConPCC Des. Life = 20 SCI = 100 %CDFU = 97

| Layer Material | Thickness (in) | Modulus or R (psi) |
|-------------------------|----------------|--------------------|
| P-401/P-403 HMA Overlay | 5.00 | 200,000 |
| PCC Surface | 16.00 | 700 |
| P-304 CTB | 6.00 | 500,000 |
| P-209 CrAg | 9.00 | 29,397 |
| Subgrade | k = 100.0 | 9,616 |

Total thickness to the top of the subgrade, t = 36.00 in

Design Stopped 92.58; 0.45

Aircraft

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD - Sample HMA Overlay Design

Asphalt Over Rigid Pavement – Overlay Design

Final Pavement Section

Requires ~6.0 inch
overlay thickness

FAARFIELD - Modify and Design Section ACConPCC in Job PROJECT

Section Names
ACConPCC
NewFlexible
Overlay

PROJECT ACConPCC Des. Life = 20 SCI = 100 %CDFU = 97

| Layer Material | Thickness (in) | Modulus or R (psi) |
|---------------------------|----------------|--------------------|
| → P-401/P-403 HMA Overlay | 5.68 | 200,000 |
| PCC Surface | 16.00 | 700 |
| P-304 CTB | 6.00 | 500,000 |
| P-209 CrAg | 9.00 | 29,397 |
| Subgrade | k = 100.0 | 9,616 |

N = 4; Str Life = 20.0 yrs; t = 36.68 in

Design Stopped 1004.20;

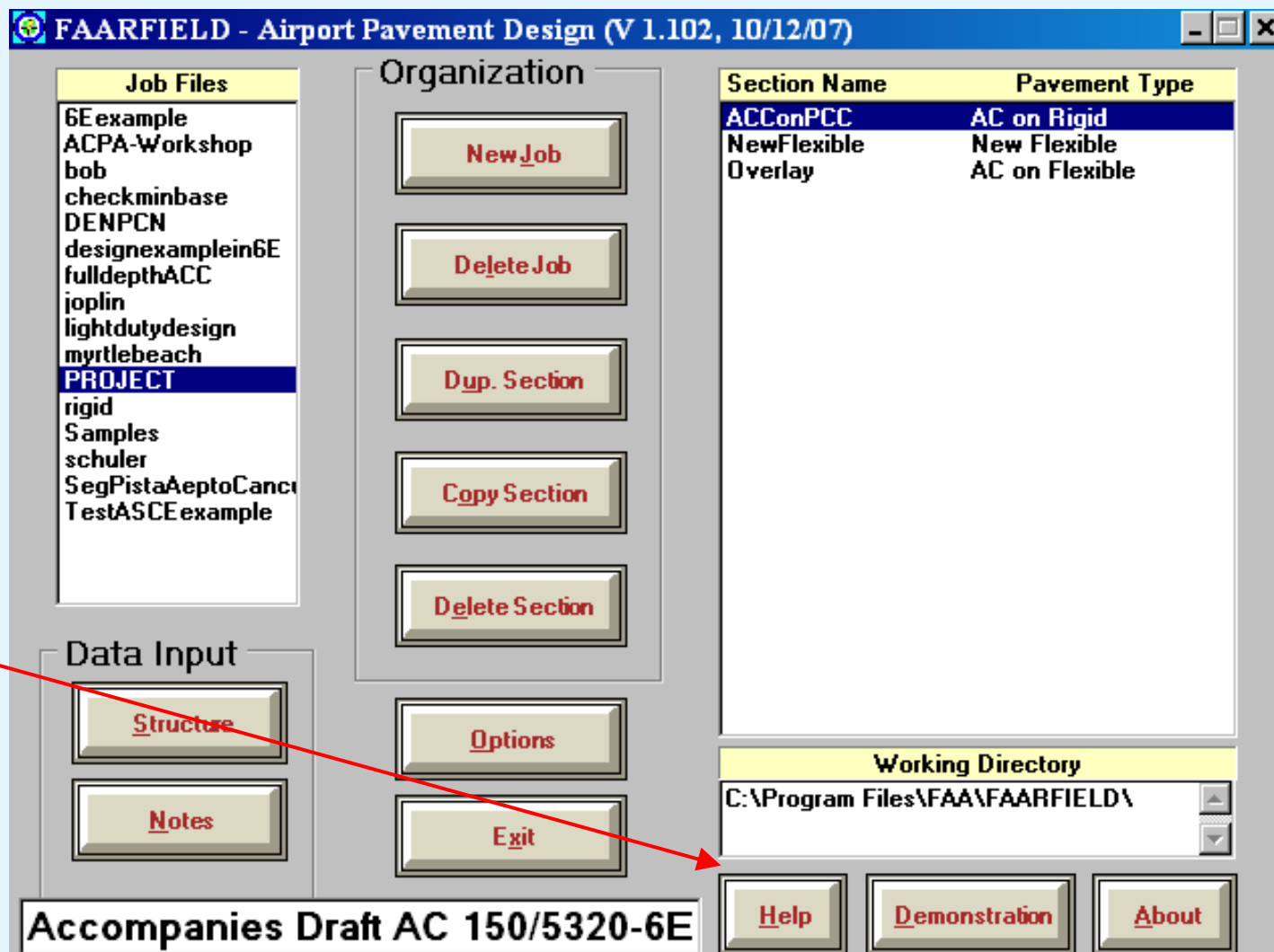
Aircraft

Back Help Life Modify Structure Design Structure Save Structure

FAARFIELD - Help Manual

Interactive User's Manual / Help File

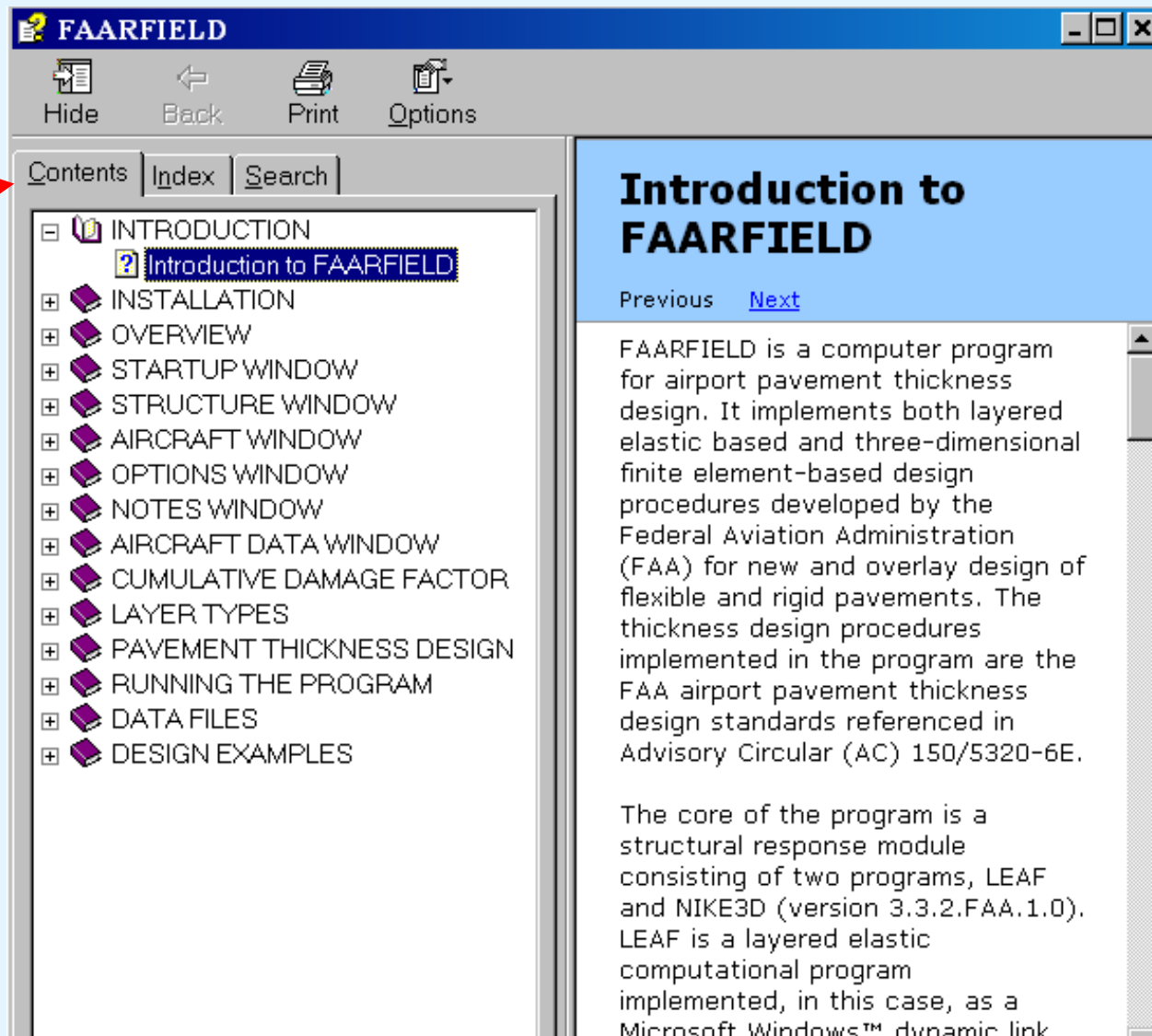
For assistance
with the program
click the Help key



FAARFIELD - Help Manual

Interactive User's Manual / Help File

Search by
Contents/chapters,
Index, or word
search

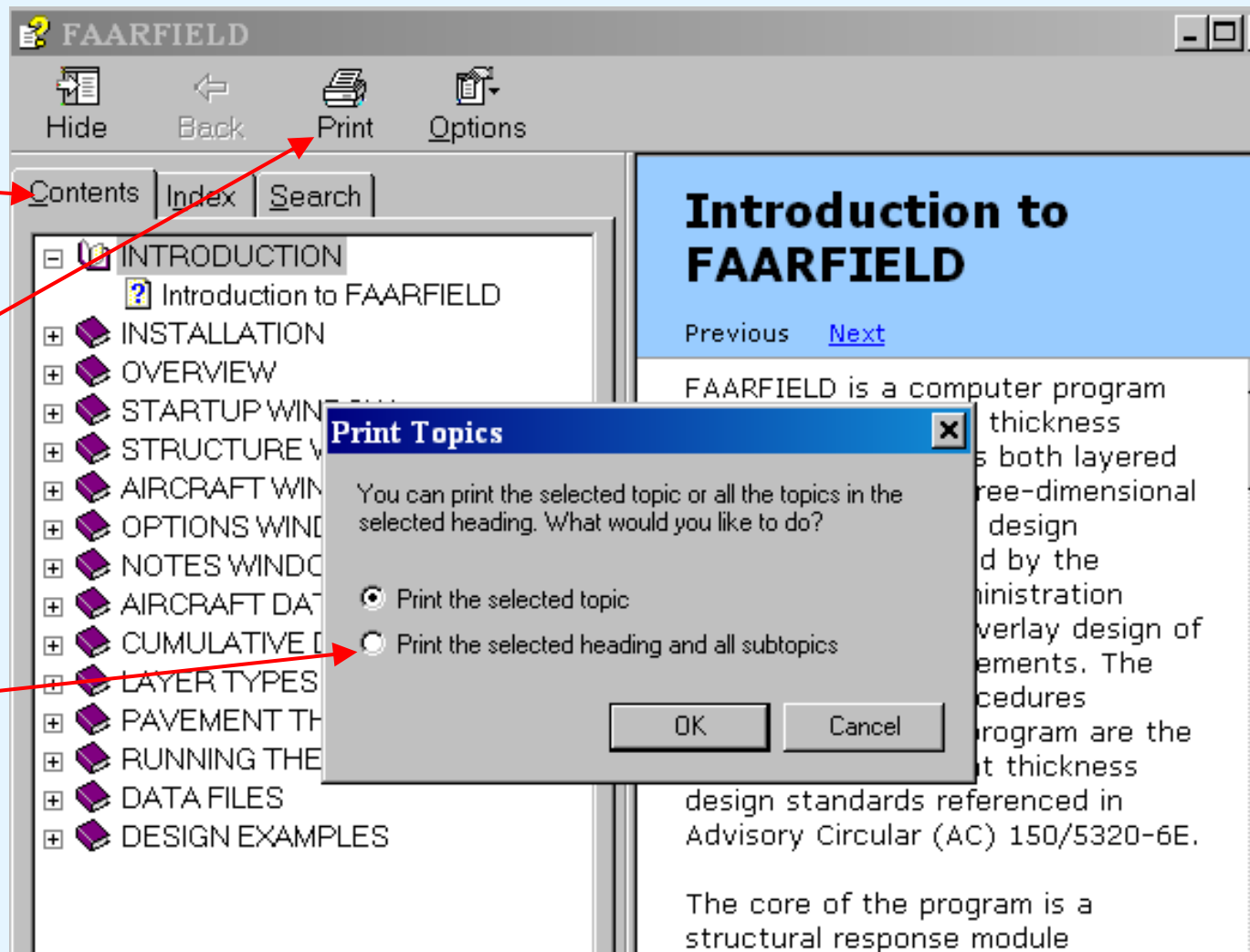


FAARFIELD - Help Manual

Printing Help Manuals

To print the manual move to the “Contents” tab and click Print

Select “Print the selected heading and all subtopic”
Do this for each heading





Job Files

6Eexample
ACPA-Workshop
bob
checkminbase
DENPCN
designexamplein6E
fulldepthACC
joplin
lightdutydesign
myrtlebeach
rigid
Samples
schuler
SegPistaAepthCancu
TestASCEexample

Organization

NewJob

Delete Job

Dup. Section

Copy Section

Delete Section

Data Input

Structure

Notes

Options

Exit

Section Name

Pavement Type

NewFlex

New Flexible

NewRigid

New Rigid

Software Available at:

**[http://www.faa.gov/airports_airtraffic/
airports/construction/design_software/](http://www.faa.gov/airports_airtraffic/airports/construction/design_software/)**

Working Directory

C:\Program Files\FAA\FAARFIELD\

Help

Demonstration

About



- Job Files
- 6E example
 - ACPA-Workshop
 - bob
 - checkminbase
 - DENPCN
 - designexamplein6E
 - fulldepthACC
 - joplin
 - lightdutydesign
 - myrtlebeach
 - rigid
 - Samples
 - schuler
 - SegPistaAeptoCancu
 - TestASCEexample

Organization

New Job

Design Job

Dup. Section

Top Section

Delete Section

| Section Name | Pavement Type |
|--------------|---------------|
| NewFlex | New Flexible |
| NewRigid | New Rigid |

Thank You

Questions?

Data Input

Rodney Joel, P.E.
Civil Engineer / Airfield Pavements
FAA, Office of Airport Safety and Standards
Airport Engineering Division, AAS-100
rodney.joel@faa.gov

Working Directory

C:\Program Files\FAA\FAARFIELD\

- Help
- Demonstration
- About